AM/FM STEREO RECEIVER model R600

LUXMAN 600

SERVICE MANUAL

R600 CIRCUIT DESCRIPTION

Power Supply

The mains input to the receiver goes via 2 pole power switch to the mains transformer which has two secondary windings:

1) A 7-volt winding for the panel lamps.
2) A 50-0-50 volt winding to provide 55-volt DC for the audio power amp, pre-amp and tuner sections.

The Q608 (2SC1509) transistor is used as a ripple filter providing 43-volt to the pre-amp section and the Q610 (2SC1509) transistor is used as part of the over load protection as well as a ripple filter for the early stage of the power amp at the voltage of 52-volt. A potential divider using a zenor diode is used to obtain from 55-volt a 12-volt DC supply for AM and FM tuner sections. There are fuses in the secondaries for transformer protection.

POWER AMPS

The circuit is basically a 6 transistor direct coupled quasi complementary design, since only one power supply voltage with respect to ground is used, the audio from the proceeding pre-amp tone control stages is capacitor coupled to the base of the first PNP transitor, this base is also biased to approximately half supply volts so therefore is used as a reference to set the output stage to half supply, D.C. negative feedback from the output is applied to the emitter, so that the base and emitter form a simple type of voltage comparitor.

The collector is coupled to the base of the second transistor which is the voltage driver for the power transistor emitter followers.

Two NPN transistors form the positive power emitter followers and a PNP, NPN compound form the negative power emitter followers. Their bases are biased by a 2 diode device (SV-02) and a bias trim pot to set the output idling current at 35mA.

The output from the junction of these four transistors is coupled by a 2200μF condenser to the loudspeaker terminals. A condenser and two resistors form a bootstrap constant current collector load for the voltage amplifier transistor.

Overall AC feed back is taken from the loud speaker side of the output condenser and applied back to the emitter of the first transistor.

Audio is also taken from the speaker side of the condenser via a 470 ohms resistor to the headphone socket.

PRE AMP

The RIAA amplifier uses an NPN and PNP direct coupled pair of transistors which are selected low noise types, the equalization and DC feedback are taken from the collector of the PNP back to the emitter of the input NPN transistor. This amp has a gain of 36 db (2.5 mV – 150 mV) at 1 KHz. The linearity of this direct coupled combination offers high overload capabilities (100 mV at 1 KHz). The 150 mV. nominal level is at the same level as the other functions. The Function Switch selects AM, FM, AUX and Phono. This audio then goes to the tape monitoring function switches.

The Tape Monitor Switch allows selection of either the direct programme source as selected by the Function Selector or play back from a tape recorder, if the tape recorder has a three head configuration, then in the monitor position it is possible to compare the recorded signal with the direct signal almost immediately.

The required selection will then go to the 2 transistor NPN, PNP direct coupled flat response amp which drive succeeding tone control circuit with low impedance. A NPN transistor is used in a Baxandale-type active bass and treble control, operating in a virtual earth mode with the input audio at the boost point of the controls and the base of the transistor fed from the slider of the bass control via C908, the collector being the feedback point to the controls and providing the output which is at unity gain with respect to the input to drive the filters and the power amplifier. The filters are constructed by CR type 6 db/oct hi and low cut filters with hi cut 7 KHz and off, and low cut 70 Hz and off.

AM SECTION

A superhet design incorporates an integrated circuit for all stages, eg, the mixer, local oscillator and two stages of IF amplification, the IF being 455 KHz. A ferrite rod antenna with three winding is used, the first winding is connected to the External Antenna Terminal, the second to the first section of two gang tuning condenser, the last winding then feeds the input of the I.C.. The I.C. which includes all the necessary stages produces an audio signal at its output suitable for directly feeding the Function Selector.

FM SECTION

The front end has a three gang tuning capacitor and consists of a dual gate MOS FET for the tuned RF amp, which feeds via a tuned transformer, the dual gate MOS FET mixer.

A bipolar transistor "Colpitts" oscillator operates at 10.7 MHz above the incoming signal. C112-C114 are negative temperature coefficient condensers to stabilize the oscillator to less than 25KHz per 10 deg. Celsius.

The output is then fed to the gate of the mixer, the resultant 10.7 MHz passes through a single tuned IFT. The front end is well shielded to prevent any spurious radiation, and to offer good image and selectivity responses.

IF and MPX

The IF strip is contained on the same printed board as the front end, the stereo multiplex decorder and muting circuit. Output signal from front end goes through two stages of ceramic filters and transistor amplifiers. Then the 10.7 MHz signal is amplified and limited by integrated circuit (IC201) which contains three stage amplifiers and two stage differential amplifiers. A differential circuit with a built-in constant current source provides full limiting, this goes to the discriminator which provides the composite audio output for multiplex. The collector of the second IF transistor provides the signal for the AGC and tuning meter.

A single transistor is used to provide muting control circuitry and an output which is combined with the signal from the AGC to drive the meter.

At the audio output, when the receiver is off-tuned from centre, either a positive or negative DC will appear which is monitored by a bi-phase detector using two NPN transistor which with another NPN forms an "AND" gate for a trigger circuit inclosed in the multiplex IC and muting circuit.

The composite audio passes on to the IC multiplex, which will derive to the L and R audio output. The IC also is connected directly to the stereo indicator lamp. The Left and Right go through LC type rejection filters to remove the 19 KHz pilot.

Finally, a one transistor amplifier is used in each channel to raise the level to 600 mv for the audio pre amp. A de-emphasis switch has been incorporated on the chassis for selecting either 75 μsec or 50 μsec time constant.

R600 ALIGNMENT PROCEDURE

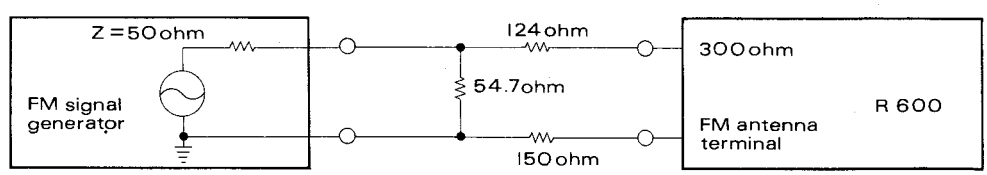
The alignment procedure described in each chart may be performed independently, without affecting the others.
Warm up the signal generators for at least 15 minutes to make certain that they are stabilized at their operating temperature particularly generators containing vacuum tubes. Consult the instruction manual supplied with the particular test instrument for specific information concerning connection and operation.
The test equipment listed here is intended only as a guide, but alternate instruments should be of similar quality.
The following instruments are required for a complete alignment of the tuner.

1. Measurement instruments and tools

Signal source	1) FM signal generator (FMSG)	Meguro MSG—285A or equivalent
	2) Sweep generator (SWG)	JRC NJM—5217C or equivalent
	3) AM signal generator (AMSG)	Meguro MSG—221C or equivalent
	4) FM stereo modulator (MPXSG)	Sound technology—1000A or equivalent
	5) Audio oscillator (AFO) 10 - 100KHz 0.2% accuracy, Dist. 0.1%	Oscillation freq. range 10 - 100,000Hz, calibration error within 0.2%, distortion 0.1%
	6) AM standard loop antenna	Meguro MLA-1001B or equivalent
Output indicator	7) Oscilloscope (CRO) Mid bandwidth 5MHz	Iwatsu SS-5057V or equivalent
	8) Distortion meter (HDM)	Shibaden CR-6S or equivalent
	9) AC volt meter (ACVTVM)	Kikusui 164 or equivalent
	10) DC volt meter (DCVTVM)	Kikusui 107A or equivalent
Tools	11) Hex head alignment tool	
	12) Thin plastic shaft alignment tool	

2. General alignment conditions

1) The normal test voltage is within 10% of what is indicated on the receiver with less than 2% harmonic distortion.
2) Unless otherwise specified, the normal ambient temperature is 15—25°C and humidity 55—75%. But if this is not possible, 5—35°C, 45—85% will provide acceptable results.
3) FM dummy antenna shall be as follows if not otherwise specified. The output voltage of the signal generator is 1/4 of the unloaded terminal voltage.



4) Connect the low side of signal source and the output indicator to the chassis ground as close as possible to the high side connection unless otherwise specified.
5) The 10.7MHz marker used in each section of the alignment should be the same.
6) Marker insertion and amplitude should not distort the oscilloscope trace.
7) The AM standard loop antenna should be set above the ferrite loopstick antenna.
8) The output level of the sweep generator is measured by the output attenuator regardless of its terminated impedance.
9) FM modulation is 100% with ±75KHz.
10) All tuner audio output measurement are at REC. OUT.

Step	Signal Source Connected to	Set signal to	Set Radio Dial to	Output Indicator Connected to	Adjust	Adjust for
1	Set selector switch to "FM", muting switch to "off", and turn power switch "on".					
2				DC VTVM P.C.B. #0.023 (24)		Check that voltage is between 11.4 ~ 12.6V
3				Refer circuit diagram		Check each part voltage if necessary
4	Sweep generator P.C.B. #0023 T.P.	±400KHz sweep centred at 10.7MHz generator output level 90-100dB	Quiet point on band	Oscilloscope P.C.B. #0023 CP-1		Due to the fixed frequency of the ceramic filters, find the centre frequency of a symmetrical band pass response. Make a note of it (for example 10.75MHz)
5				Oscilloscope P.C.B. #0023 CP-1	T101core	Symmetrical response centred at the frequency noted by step 4
6				Oscilloscope P.C.B. #0023 CP-2	T202 core	
7				Oscilloscope P.C.B. #0023 CP-3	T201 top core T201 bottom core	Maximum linearity and amplitude of "S" curve centred at the frequency noted by step 4
8	FM signal generator Across FM antenna terminals (300Ω) through matching network	Reduce the output level to zero (interstation receiving condition)	93MHz	DC VTVM P.C.B. #0023 CP-3	T201 top core	Zero volt
9		93MHz at 400Hz 100% modulation, output level 1mV		Oscilloscope Distortion meter AC VTVM REC OUT	T201 bottom core	Minimum distortion. At the minimum distortion setting, the output level must be within 1/2dB of peak output.
10	Repeat steps 8 and 9 as necessary to obtain maximum output level and minimum distortion at maximum point of tuning meter and the meter must also shows minimum at interstation state.					
11	FM signal generator Across FM antenna terminals (300Ω) through matching network	88MHz at 400Hz 100% modulation, generator output level 1mV	88MHz	Oscilloscope Distortion meter AC VTVM REC OUT	L103	Accurate indication of pointer on dial to within ±1 pointer width
12		108MHz at 400Hz 100% modulation, generator output level 1mV	108MHz		TC103	
13		88MHz at 400Hz 100% modulation, generator output level 5 ~ 10μV	88MHz		T101 core	Maximum indication of signal strength meter
14					L101	

Step	Signal Source Connected to	Set signal to	Set Radio Dial to	Output Indicator Connected to	Adjust	Adjust for
15	FM signal generator Across FM antenna terminals (300Ω) through matching network	88MHz at 400Hz 100% modulation, generator output level 5 ~ 10μV	88MHz	Oscilloscope Distortion meter AC VTVM REC OUT	L102	Maximum indication of signal strength meter
16		108MHz at 400Hz 100% modulation, generator output level 5 ~ 10μV	108MHz		TC101	
17					TC102	
18	Repeat steps 11 ~ 17 as necessary to obtain correct tuning on dial scale and the maximum indication of signal meter with uniform sensitivity throughout the band					
19	FM signal generator Across FM antenna terminals (300Ω) through matching network	93MHz at 400Hz 100% modulation, output level 1mV	93MHz	Oscilloscope Distortion meter AC VTVM REC OUT	T201 bottom core	Minimum distortion. At the minimum distortion setting, the output level must be within 1/2dB of peak output.
20		88MHz at 400Hz 100% modulation	88MHz			IHF maximum usable sensitivity which is the minimum output level of FMSG required for distortion and noise to be −30dB of total output
21		108MHz at 400Hz 100% modulation	108MHz			
22		98MHz at 400Hz 100% modulation output level 7μV	98MHz		VR201	Swing of signal strength meter to first indicator mark or if not possible ±1/2 is acceptable
23	Set muting switch "on"					
24	FM signal generator Across FM antenna terminals (300Ω) through matching network	98MHz at 400Hz 100% modulation generator output level 7μV	98MHz	Oscilloscope AC VTVM REC OUT	VR202	Fix VR202 at the point where output signals appear (muting adjustment)
25		98MHz at 19KHz 3 ~ 4% modulation generator output level 1mV		Oscilloscope IC301 ①	L301 core	Maximum amplitude of oscilloscope trace
26	FM signal generator Across FM antenna terminals (300Ω) through matching network	98MHz at 19KHz 10% (L−R) 400Hz 45% output level 1mV	98MHz	Oscilloscope AC VTVM REC OUT	L302 core	To obtain peak output voltage
27		98MHz at 19KHz 10% L (or R) stereo 90% modulation output level 1mV			VR301	Maximum separation
28	Repeat steps 25 ~ 27 as necessary to obtain maximum separation both L and R channel					

Step	Signal Source Connected to	Set signal to	Set Radio Dial to	Output Indicator Connected to	Adjust	Adjust for
29	Set selector switch to "AM"					
30	Sweep geneator P.C.B.#0023 19 through 1μF mylar capacitor	±20 ~ 25KHz sweep centred at 455KHz generator output level 3mV	Quiet point on band near 600KHz	Oscilloscope P.C.B.#0023 CP-4	T401 red core	Maximum symmetrical response with flat top Do not adjust for two humps
31					T401 blue core	
32					T402 black core	
33	Adjust VR401 and VR402 to mechanical center position					
34	AM signal generator Standard radiating loop antenna placed near AM built in antenna	600KHz at 400Hz 30% modulation, field strength 50dB/m	600KHz	Oscilloscope AC VTVM REC OUT	L401 core	Accurate indication of pointer on dial to within ±1 pointer width
35					L1 core	Maximum reading on AC VTVM
36		1400KHz at 400Hz 30% modulation, field strength 50dB/m	1400KHz		TC402	Accurate indication of pointer on dial to within ±1 pointer width
37					TC401	Maximum reading on AC VTVM
38	Repeat steps 34 ~ 37 as necessary to obtain exact tuning on dial scale and maximum sensitivity					
39	AM signal generator Standard radiating loop antenna placed near AM bar antenna	1000KHz at 400Hz 30% modulation, field strength 45dB/m	1000KHz	Oscilloscope AC VTVM REC OUT	VR401	Audio output level should be 95mV
40		1000KHz at 400Hz 30% modulation, field strength 74dB/m			VR402	Adjust to read 60 ~ 80% of full scall of meter

SEMICONDUCTOR SPECIFIC CHART

TRANSISTORS (Ta=25°C)

TYPE	MAX. RATING			CHARACTERISTICS											
	Pc	Vceo	Ic	hfe				fT MHz			NF				
	W	V	mA	min	max	IcmA	Vce V	typ	Ic mA	Vce V	max dB	Ic mA	Vce V	fre Hz	Zg Ω
2SA640F	0.25	50	50	225	450	0.5	3	100	1	6	4	0.3	6	100	10K
2SA763-WL5	0.2	50	50	250	500	1	6	120	1	6					
2SA777R	0.75	80	500	130	220	150	10	120	50	10					
2SC710C	0.2	25	30	55	110	1	6	200	1	6					
2SC711F	0.2	25	100	250	500	1	6	150	1	6					
2SC945P	0.25	50	100	200	400	1	6	300	1	6	20	0.3	6	100	10K
2SC1000BL	0.2	50	100	350	700	2	6	80	1	6	2	0.1	6	100	10K
2SC1030B	50.0	80	6000	60	120	1000	5	10	1000	5					
2SC1345E	0.2	50	100	400	800	2	12	230	2	12	1	0.1	6	1K	10K
2SC1509R	0.75	80	500	130	220	150	10	120	50	10					
2SC1539	0.15	20	30	120	1200	0.5	3	200	10	5					

FIELD EFFECT TRANSISTOR (Ta=25°C)

	MAX. RATING			CHARACTERISTICS						
	PT	VDS	ID	IDSS		mA	Crss	pF	NF	
	mW	V	mA	min	max	Vds V		Vds V	typ	Vds V
3SK45B, C	330	22	35	11	32	15	0.03	15	2.2	15

DIODES (Ta=25°C)

TYPE	MAX. RATING			CHARACTERISTICS			
	If	Vr	Surge	If		Ir	
	A	V	A	mA	Vf V	μA	Vr V
IN60P	0.05	−35	0.5	0.004	1	30	−10
IN60AMZ	0.05	−30	0.5	0.015	1	75	−10
KB169	0.05	−3		3	0.7	10	−3
IS188AM	0.05	−35	0.5	4	1	75	−10
IS2473	0.11	−35	0.4	100	1.2	0.5	−35
VO3C	1.1	−200	30				
BZ-120				20	13	10	−10
BZ-140				20	14	10	−11

INTEGRATED CIRCUIT SPECIFIC CHART

AN277

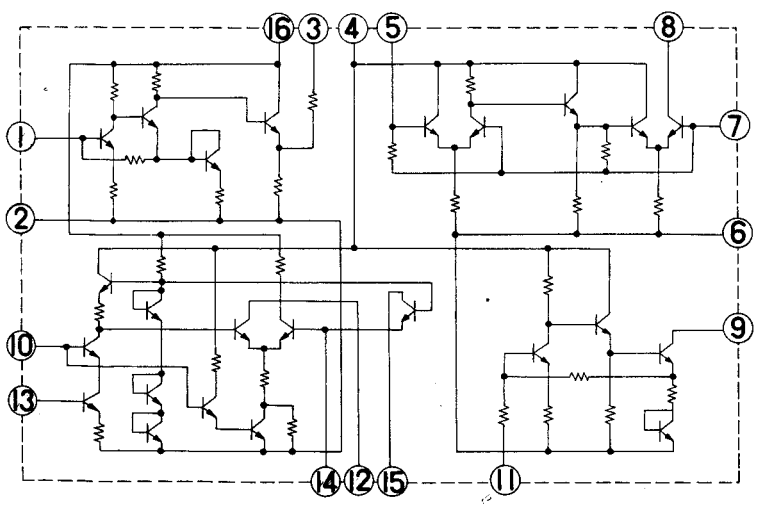
MAXIMUM LIMITS OF DEVICE (Ta=25°C)

	Symbol	Rating	Unit
Max. Vcc	Vcc	15	V
Max. dissipation	PD	400	mW
Operating temperature	Topt	−20 ~ 75	°C
Storage temperature	Tstg	−65 ~ 150	°C

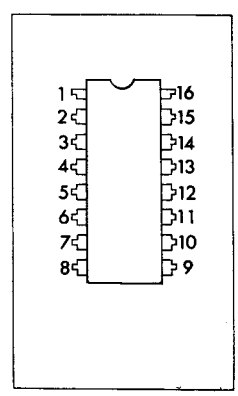
ELECTRICAL SPECIFICATION (Ta=25°C)

	Symbol	Condition of measurement	Min.	Typ.	Max.	Unit
Current	Icc	Vcc=8.2V	6.0	25	40	mA
FM-IF DETECTOR OUTPUT	Vo (FM)	f=10.7MHz, Input=200μV	4.5	9.0	18	mV
AM-IF DETECTOR OUTPUT	Vo (AM)	f=450KHz, Input=33μV	8.0		16	mV

EQUIVALENT CIRCUIT



PIN CONNECTOR (Top view)



LA3301

ABSOLUTE MAXIMUM RATING. (Ta=25°C)

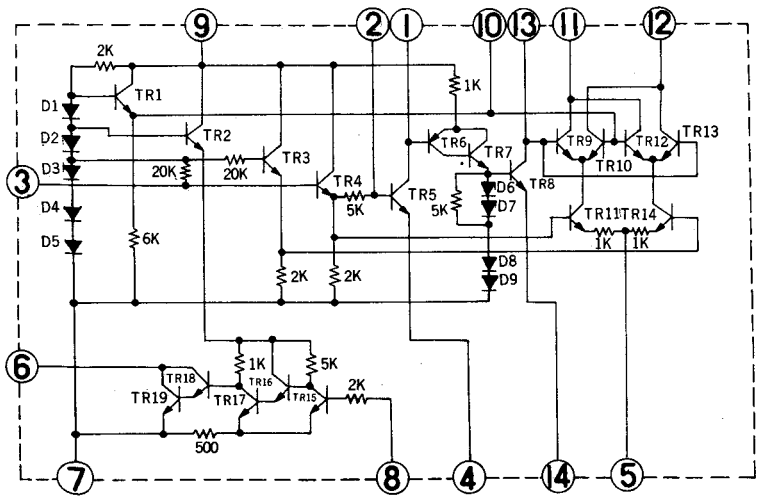
	Symbol	Rating	Unit
Supply voltage	Vcc	20	V
Lamp driver current max.	IL	40	mA
Operating temperature	Topr	−20 ~ 80	°C
Storage temperature	Tstg	−40 ~ 125	°C

Note:
Condition of measurement =
input signal 100mV rms (Pilot 10%)

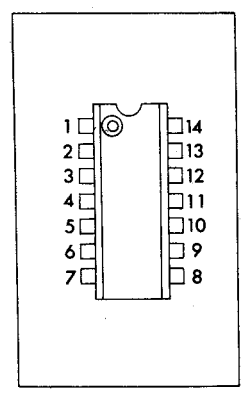
ELECTRICAL CHARACTERISTICS (Ta=25°C, Vcc=6V)

	Symbol	Condition of measurement	Min.	Typ.	Max.	Unit
Circuit current	Icc	at zero signal		7.0	10.5	mA
Separation	Sep	at 1kHz	30			dB
Channel balance	ch. B	(Mono)			2.0	dB
Distortion	T.H.D.	(Mono)			1.0	%
Input voltage for ST. IND. ON	Vi		50		100	mV
Output voltage	Vo		71		136	mV
SCA rejection	SCA Rejection			55		dB

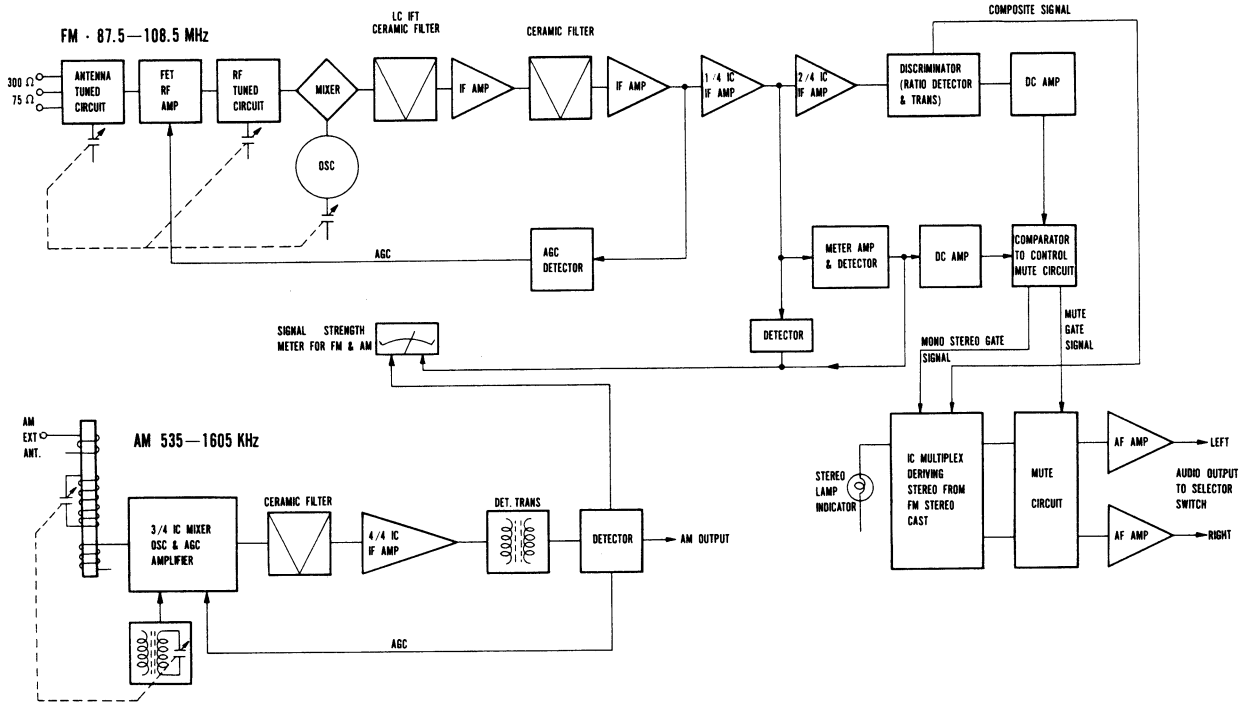
EQUIVALENT CIRCUIT



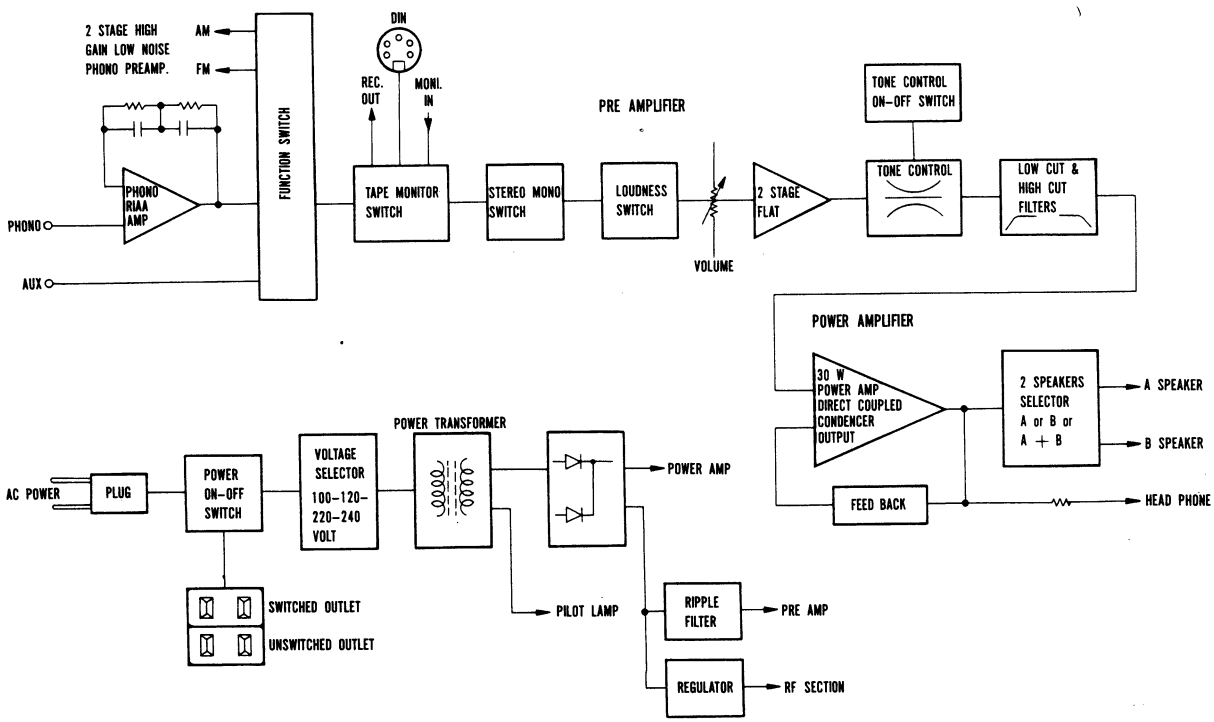
PIN CONNECTOR (Top view)



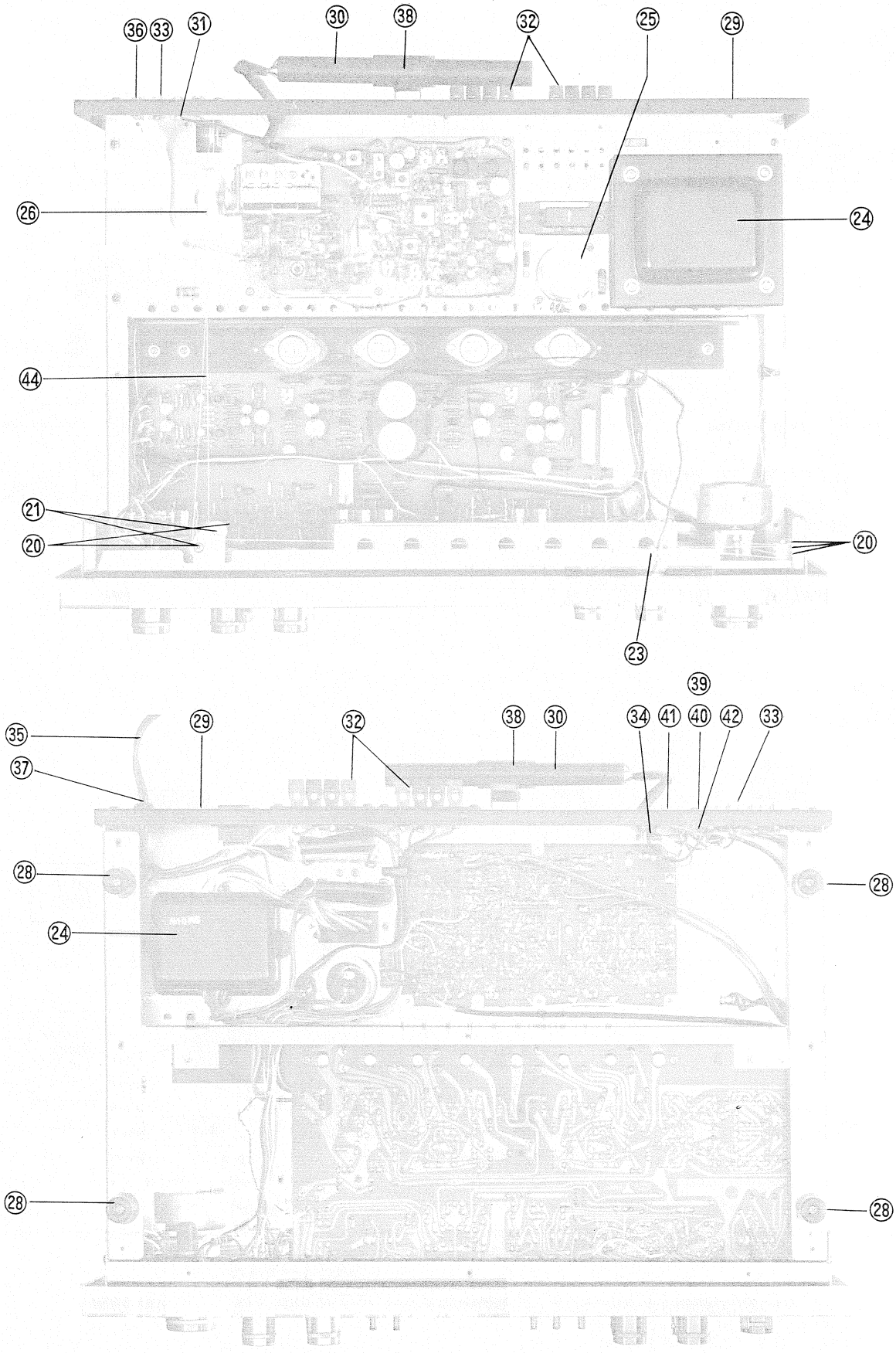
BLOCK DIAGRAM
■RF SECTION



BLOCK DIAGRAM
■AUDIO SECTION



VOLTAGE SELECTOR & OUTLETS ARE FOR Ⓔ MODEL ONLY.
FOR BREVITY, ONLY SINGLE
CHANNEL IS SHOWN EXCEPT POWER SUPPLY.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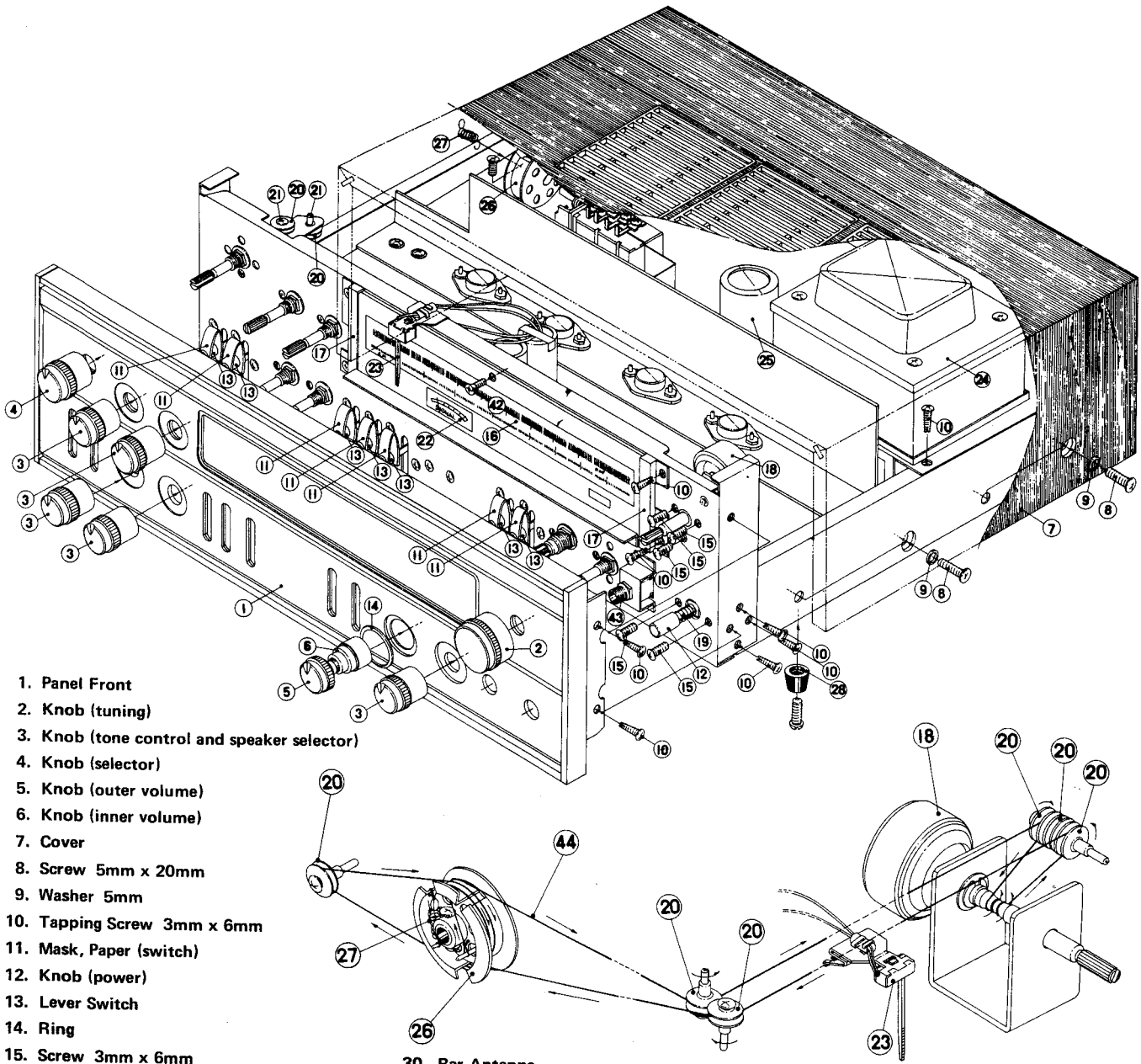
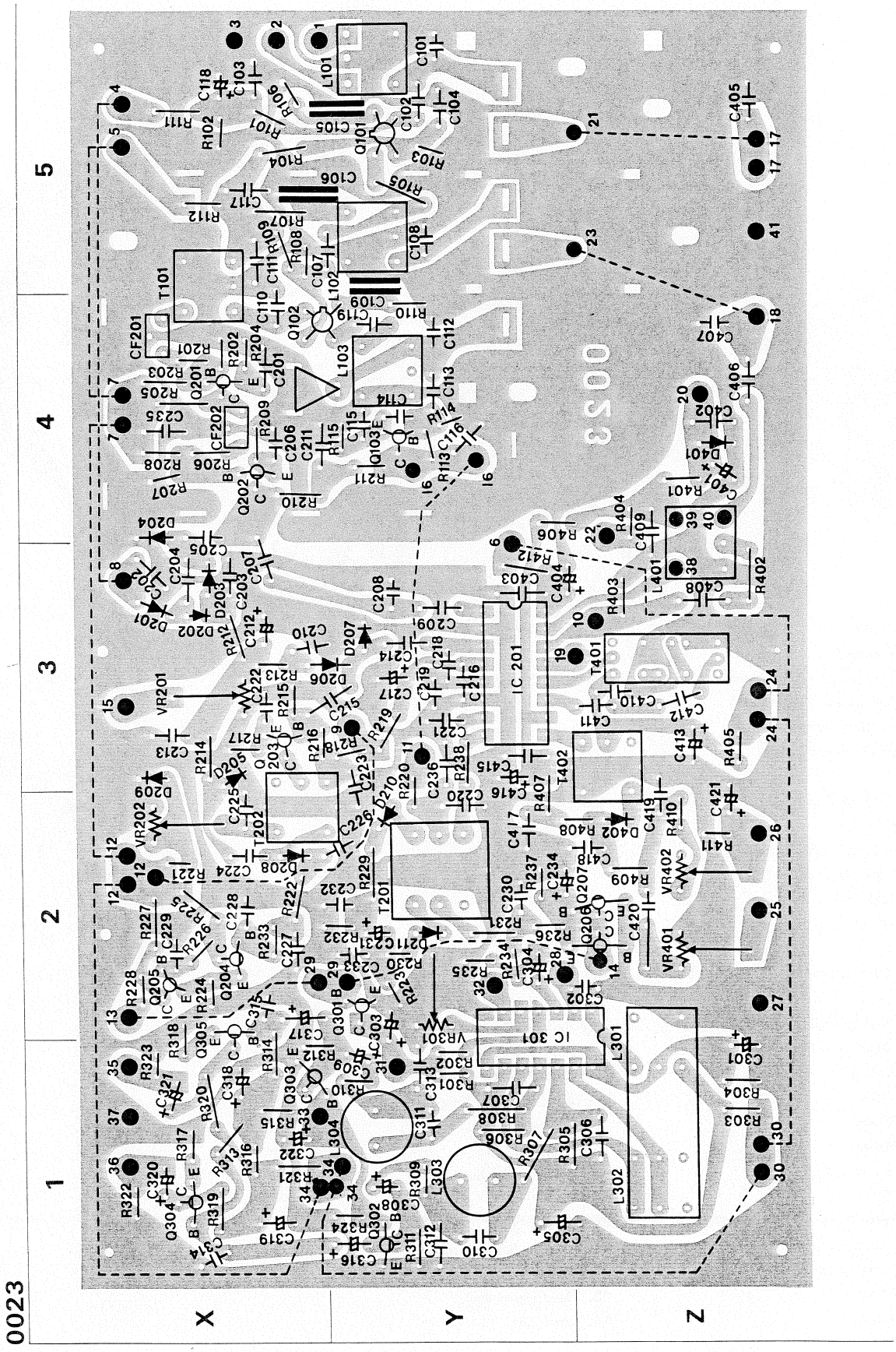


1. Panel Front
2. Knob (tuning)
3. Knob (tone control and speaker selector)
4. Knob (selector)
5. Knob (outer volume)
6. Knob (inner volume)
7. Cover
8. Screw 5mm x 20mm
9. Washer 5mm
10. Tapping Screw 3mm x 6mm
11. Mask, Paper (switch)
12. Knob (power)
13. Lever Switch
14. Ring
15. Screw 3mm x 6mm
16. Dial Scale
17. Fitting Metal for Dial Scale
18. Tuning Shaft and Flywheel Assy.
19. Power Switch
20. Plastic Pulley
21. Pulley Shaft
22. Signal Meter
23. Tuning Pointer Ass'y
24. Power Trans
25. Electrolytic Capacitor, 4700μ 50V
26. Drum (tuning capacitor)
27. Spring (tension for dial cord)
28. Plastic Foot
29. Panel Back

.30. Bar Antenna
31. Antenna Terminal
32. Speaker Terminal
33. Pin Jack Female
34. DIN Type Connector
35. AC Cord with Plug
36. Earth Terminal
37. Cord Bushing
38. Bracket, Antenna
39. Nut 3mm
40. Screw 3mm x 8mm
41. Tapping Screw 3mm x 8mm
42. Flat Head Screw 3mm x 6mm
43. Headphone Jack
44. Cord, Dial


0023
X
Y
Z
1
2
3
4
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IC 201
IC 301
L301
L302
L303
L304
T201
T202
T401
T402
VR201
VR202
VR301
VR401
VR402
T101
L101
L102
L103
Q101
Q102
Q103
Q201
Q202
Q203
Q204
Q205
Q207
Q208
Q301
Q302
Q303
Q304
Q305
Q206
D201
D202
D203
D204
D205
D206
D207
D208
D209
D401
CF201
CF202

#0023 Component Location

R101 ..... X5
R102 ..... X5
R103 ..... Y5
R104 ..... X5
R105 ..... Y5
R106 ..... X5
R107 ..... X5
R108 ..... X5
R109 ..... X5
R110 ..... Y4
R111 ..... X5
R112 ..... X5
R113 ..... Y4
R114 ..... Y4
R115 ..... Y4

R201 ..... X4
R202 ..... X4
R203 ..... X4
R204 ..... X4
R205 ..... X4
R206 ..... X4
R207 ..... X4
R208 ..... X4
R209 ..... X4
R210 ..... X4
R211 ..... Y4
R212 ..... X3
R213 ..... X3
R214 ..... X3
R215 ..... X3
R216 ..... Y3
R217 ..... X3
R218 ..... Y3
R219 ..... Y3
R220 .... Y2, Y3
R221 ..... X2
R222 ..... X2
R223 ..... Y2
R224 ..... X2
R225 ..... X2
R226 ..... X2
R227 ..... X2
R228 ..... X2
R229 ..... Y2
R230 ..... Y2
R231 ..... Y2
R232 ..... Y2
R233 ..... X2
R234 ..... Y2
R235 ..... Y2
R236 ..... Y2
R237 ..... Y2
R238 ..... Y3

R301 ..... Y1
R302 ..... Y1
R303 ..... Z1
R304 ..... Z1
R305 ..... Z1
R306 ..... Y1
R307 ..... Y1
R308 ..... Y1
R309 ..... Y1

R310 ..... Y1
R311 ..... Y1
R312 ..... X1
R313 ..... X1
R314 ..... X1
R315 ..... X1
R316 ..... X1
R317 ..... X1
R318 .... X1, X2
R319 ..... X1
R320 ..... X1
R321 .... X1, Y1
R322 ..... X1
R323 ..... X1
R324 ..... Y1
R401 ..... Z4
R402 ..... Z3
R403 ..... Z3
R404 ..... Z4
R405 ..... Z3
R406 .... Y4, Z4
R407 .... Y2, Y3
R408 ..... Z2
R409 ..... Z2
R410 ..... Z2
R411 ..... Z2
R412 ..... Y3

C101 ..... Y5
C102 ..... Y5
C103 ..... X5
C104 ..... Y5
C105 ..... Y5
C106 .... X5, Y5
C107 ..... Y5
C108 ..... Y5
C109 ..... Y5
C110 .... X4, X5
C111 ..... X5
C112 ..... Y4
C113 ..... Y4
C114 ..... Y4
C115 ..... Y4
C116 ..... Y4
C117 ..... X5
C119 ..... Y4

C201 ..... X4
C202 ..... X3
C203 ..... X3
C204 ..... X3
C205 ..... X4
C206 ..... X4
C207 .... X3, X4
C208 ..... Y3
C209 ..... Y3
C210 .... X3, Y3
C211 ..... Y4
C212 ..... X3
C213 ..... X3
C214 ..... Y3
C215 ..... Y3
C216 ..... Y3

C217 ..... Y3
C218 ..... Y3
C219 ..... Y3
C220 ..... Y2
C221 ..... Y3
C222 ..... X3
C223 .... Y2, Y3
C224 ..... X2
C225 ..... X2
C226 ..... Y2
C227 ..... X2
C228 ..... X2
C229 ..... X2
C230 ..... Y2
C231 ..... Y2
C232 ..... Y2
C233 ..... Y2
C234 ..... Y2
C235 ..... X4

C301 ..... Z1
C302 ..... Z2
C303 ..... Y2
C304 ..... Y2
C305 .... Y1, Z1
C306 ..... Z1
C307 ..... Y1
C308 ..... Y1
C309 ..... Y1
C310 ..... Y1
C311 ..... Y1
C312 ..... Y1
C313 ..... Y1
C314 ..... X1
C315 ..... X2
C316 ..... Y1
C317 .... X2, Y2
C318 ..... X1
C319 ..... X1
C320 ..... X1
C321 ..... X1
C322 ..... X1

C401 ..... Z4
C402 ..... Z4
C403 ..... Y3
C404 ..... Z3
C405 ..... Z5
C406 ..... Z4
C407 ..... Z4
C408 ..... Z3
C409 .... Z3, Z4
C410 ..... Z3
C411 ..... Z3
C412 ..... Z3
C413 ..... Z3
C415 ..... Y3
C416 ..... Y3
C417 ..... Y2
C418 ..... Z2
C419 .... Z2, Z3
C420 ..... Z2
C421 ..... Z2, Z3

VR201 ..... X3
VR202 ..... X2
VR301 ..... Y2
VR401 ..... Z2
VR402 ..... Z2

Q101 ..... Y5
Q102 .... X4, Y4
Q103 ..... Y4
Q201 ..... X4
Q202 ..... X4
Q203 ..... X3
Q204 ..... X2
Q205 ..... X2
Q206 ..... Z2
Q207 ..... Z2
Q301 ..... Y2
Q302 ..... Y1
Q303 ..... X1
Q304 ..... X1
Q305 .... X1, X2

IC201 ..... Y3
IC301 .... Y1, Y2

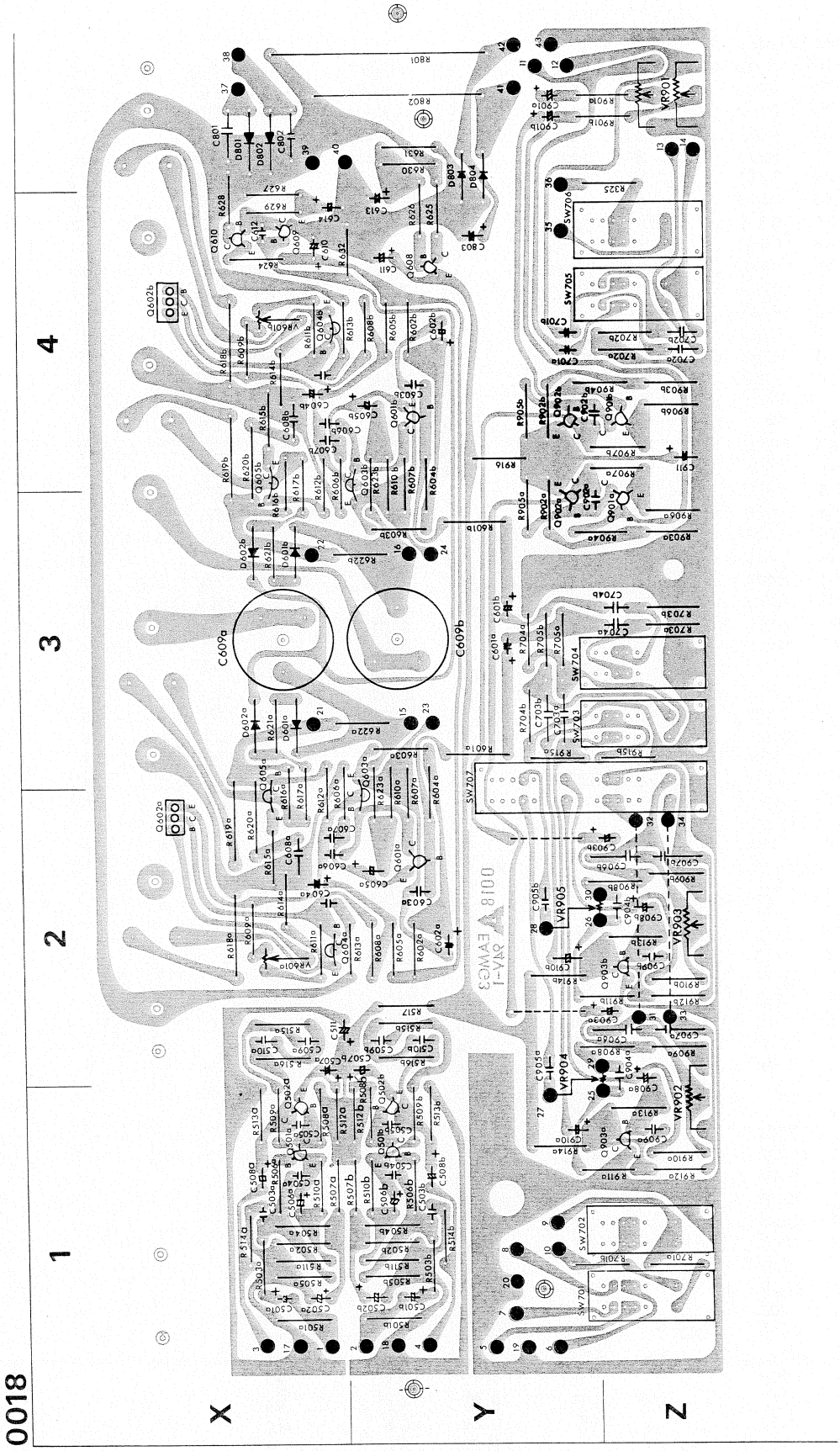
D201 ..... X3
D202 ..... X3
D203 ..... X3
D204 ..... X4
D205 ..... X3
D206 ..... Y3
D207 ..... Y3
D208 ..... X2
D209 ..... X3
D210 ..... Y2
D211 ..... Y2
D401 ..... Z4
D402 ..... Z2

CF201 ..... X4
CF202 ..... X4

T101 .... X4, X5
T201 ..... Y2
T202 ..... X2
T401 ..... Z3
T402 ..... Z3

L101 ..... Y5
L102 ..... Y5
L103 ..... Y4
L301 .... Z1, Z2
L302 ..... Z1
L303 ..... Y1
L304 ..... Y1
L401 .... Z3, Z4

(1) X5, Y5
(2) X5
(3) X5
(4) X5
(5) X5
(6) Y3, Y4
(7) X4
(8) X3
(9) Y3
(10) Z3
(11) Y3
(12) X2
(13) X2
(14) Z2
(15) X3
(16) Y4
(17) Z5
(18) Z4
(19) Z3
(20) Z4
(21) Z5
(22) Z4
(23) Z5
(24) Z3
(25) Z2
(26) Z2
(27) Z2
(28) Y2
(29) X2, Y2
(30) Z1
(31) Y1
(32) Y2
(33) X1
(34) X1, Y1
(35) X1
(36) X1
(37) X1
(38) Z3
(39) Z4
(40) Z4
(41) Z5


0018
1
2
3
4
X
Y
Z
C609a
C609b
SW707
SW702
SW703
SW704
SW705
SW706
VR901
VR902
VR903
VR904
VR905
SIGMA 8100

#0018 Component Location

R325 .... Y5, Z5
R501a X1
R501b Y1
R502a X1
R502b Y1
R503a X1
R503b Y1
R504a X1
R504b Y1
R505a X1
R505b Y1
R506a X1
R506b Y1
R507a X1
R507b Y1
R508a X1
R508b Y1
R509a X1
R509b Y1
R510a X1
R510b Y1
R511a..... X1
R511b Y1
R512a X1
R512b Y1
R513a X1
R513b Y1
R514a X1
R514b Y1
R515a X2
R515b Y2
R516a X2
R516b Y2
R517 ..... Y2

R601a Y3
R601b Y3
R602a Y2
R602b Y4
R603a Y3
R603b Y3
R604a ... Y2, Y3
R604b ... Y3, Y4
R605a Y2
R605b Y4
R606a ... Y2, Y3
R606b ... Y3, Y4
R607a ... Y2, Y3
R607b ... Y3, Y4
R608a Y2
R608b Y4
R609a X2
R609b X4
R610a ... Y2, Y3
R610b ... Y3, Y4
R611a X2
R611b X4
R612a ... X2, X4
R612b ... X3, X4
R613a Y2
R613b Y4
R614a X2
R614b X4
R615a X2
R615b X4
R616a ... X2, X3
R616b ... X3, X4
R617a ... X2, X3
R617b .. X3, X4
R618a X2
R618b X4
R619a ... X2, X3
R619b ... X3, X4
R620a ... X2, X3
R620b ... X3, X4
R621a X3
R621b X3
R622a ... X3, Y3
R622b ... X3, Y3
R623a ... Y2, Y3
R623b ... Y3, Y4
R624 ..... X4
R625 .... Y4, Y5
R626 .... Y4, Y5
R627 .... X4, X5
R628 .... X4, X5
R629 ..... X4
R630 ..... Y5
R631 ..... Y5
R632 ..... Y4
R701a Z1
R701b ... Y1, Z1
R702a Z4
R702b Z4
R703a Z3
R703b Z3
R704a Y3
R704b Y3
R705a Y3
R705b Y3

R801 .... X5, Y5
R802 .... X5, Y5

R901a ... Y5, Z5
R901b ... Y5, Z5
R902a ... Y3, Y4
R902b Y4
R903a Z3
R903b Z4
R904a ... Y3, Z3
R904b ... Y4, Z4
R905a ... Y3, Y4
R905b Y4
R906a Z3
R906b Z4
R907a Z4
R907b Z4
R908a ... Y2, Z2
R908b ... Y2, Z2
R909a Z2
R909b Z2
R910a Z1
R910b Z2
R911a ... Y1, Z1
R911b ... Y2, Z2
R912a Z1
R912b Z2
R913a Z1
R913b Z2
R914a Y1
R914b Y2
R915a Y3
R915b Z3
R916 ..... Y4

C501a X1
C501b Y1
C502a X1
C502b Y1
C503a X1
C503b Y1
C504a X1
C504b Y1
C505a X1
C505b Y1
C506a X1
C506b Y1
C507a X2
C507b Y2
C508a X1
C508b Y1
C509a X2
C509b Y2
C510a X2
C510b Y2
C511 .... X2, Y2
C601a Y3
C601b Y3
C602a Y2
C602b Y4
C603a Y2
C603b Y4
C604a X2
C604b X4
C605a Y2
C605b Y4
C606a ... X2, Y2
C606b ... X4, Y4
C607a ... X2, Y2
C607b ... X4, Y4
C608a X2
C608b X4
C609a X3
C609b Y3
C610 ..... X4
C611 ..... Y4
C612 ..... X4
C613 ..... Y4
C614 .... X4, Y4

C701a Y4
C701b Y4
C702a Z4
C702b Z4
C703a Y3
C703b Y3
C704a Z3
C704b Z3

C801 ..... X5
C802 ..... X5
C803 ..... Y4
C901a Y5
C901b Y5
C902a Z3
C902b Z4
C903a Z2
C903b Z2
C904a ... Z1, Z2
C904b Z2
C905a ... Y1, Y2
C905b Y2
C906a Z2
C906b Z2
C907a Z2
C907b Z2
C908a Z1, Z2
C908b Z2
C909a Z1
C909b Z2
C910a Y1
C910b Y2
C911 ..... Z4

VR601a X2
VR601b X4
VR901 ..... Z5
VR902 ... Z1, Z2
VR903 ..... Z2

Q501a X1
Q501b Y1
Q502a X1
Q502b Y1
Q601a Y2
Q601b Y4
Q602a X2
Q602b X4
Q603a ... Y2, Y3
Q603b ... Y3, Y4
Q604a X2
Q604b X4
Q605a ... X2, X3
Q605b ... X3, X4
Q608 ..... Y4
Q609 ..... X4
Q610 ..... X4
Q901a Z3
Q901b Z4
Q902a Y3
Q902b Y4
Q903a Z1
Q903b Z2

D601a X3
D601b X3
D602a X3
D602b X3
D801 ..... X5
D802 ..... X5
D803 .... Y4, Y5
D804 .... Y4, Y5

SW701 ..... Z1
SW702 ..... Z1
SW703 ..... Z3
SW704 ..... Z3
SW705 ..... Z4
SW706 ..... Z4
SW707 ... Y2, Z2
(1) X1
(2) Y1
(3) X1
(4) Y1
(5) Y1
(6) Y1
(7) Y1
(8) Y1
(9) Y1
(10) Y1
(11) Y5
(12) Y5
(13) Z5
(14) Z5
(15) Y3
(16) Y3
(17) X1
(18) Y1
(19) Y1
(20) Y1
(21) X3
(22) X3
(23) Y3
(24) Y3
(25) Z1
(26) Z2
(27) Y1
(28) Y2
(29) Z2
(30) Z2
(31) Z2
(32) Z2
(33) Z2
(34) Z2
(35) Y4
(36) Y5
(37) X5
(38) X5
(39) X5
(40) Y5
(41) Y5
(42) Y5
(43) Y5

REPLACEMENT PARTS

RESISTORS; ±10% ¼ watt deposited carbon, unless noted otherwise.

SYMBOL NO.	DESCRIPTION	SYMBOL NO.	DESCRIPTION	SYMBOL NO.	DESCRIPTION	SYMBOL NO.	DESCRIPTION
R101	100K	R230	470	R408	150K	R620a, b	1W 10
R102	1M	R231	47	R409	470	R621a, b	1K
R103	100K	R232	10K	R410	3.3K	R622a, b	1W 220
R104	150K	R233	5.6K	R411	3.3K	R623a, b	1.2K
R105	100	R234	22K	R412	1K	R624	33
R106	100	R235		R451	82K	R625	47
R107	330	R236	10K			R626	47
R108	10K	R237	33K	R501a, b	68K	R627	27K
R109	220K	R238	120	R502a, b	22K	R628	33
R110	100	R251	220	R503a, b	3.9K	R629	47
R111	JUMPER	R252	100K	R504a, b	680K	R630	33K
R112	100			R505a, b	1M	R631	180K
R113	18K	R301	10K	R506a, b	180	R632	560
R114	10K	R302	1.2K	R507a, b	120K		
R115	1.8K	R303	680	R508a, b	47K	R651	1W 470
		R304	4.7K	R509a, b	470		
R201		R305	5.6K	R510a, b	27K	R701a, b	5.6K
R202	2.2K	R306	5.6K	R511a, b	820	R702a, b	27K
R203	6.8K	R307	2.2K	R512a, b	1.5K	R703a, b	820K
R204	1K	R308	2.2K	R513a, b	10K	R704a, b	33K
R205	1K	R309	10K	R514a, b	150K	R705a, b	10K
R206	220	R310	10K	R515a, b	39K		
R207	2.7K	R311	100K	R516a, b	820K	R801	10W 560
R208	15K	R312	100K	R517	4.7K	R802	7W 1K
R209	1K	R313	180K	R551a, b	1.8K	R851	56
R210	1.2K	R314	180K				
R211	470	R315	15K	R601a, b	3.3K	R901a, b	3.3K
R212	15K	R316	33K	R602a, b	47K	R902a, b	100K
R213	2.7K	R317	560	R603a, b	39K	R903a, b	10K
R214	1.5K	R318	560	R604a, b	150K	R904a, b	470K
R215	820	R319	2.2K	R605a, b	2.2K	R905a, b	10K
R216	10K	R320	2.2K	R606a, b	8.2K	R906a, b	1.2K
R217	1K	R321	1K	R607a, b	1.5K	R907a, b	5.6K
R218	470	R322	33K	R608a, b	3.3K	R908a, b	6.8K
R219	330	R323	33K	R609a, b	3.3K	R909a, b	18K
R220	270	R324	100K	R610a, b	47	R910a, b	10K
R221	33K	R325	10K	R611a, b	5.6K	R911a, b	6.8K
R222	5.6K			R612a, b	100	R912a, b	18K
R223	10K	R401	1.2K	R613a, b	10	R913a, b	820K
R224	33	R402	56	R614a, b	100	R914a, b	6.8K
R225	330K	R403	1.5K	R615a, b	10	R915a, b	220K
R226	10K	R404	680	R616a, b	100	R916	2.2K
R227	4.7K	R405	1.5K	R617a, b	270		
R228	1M	R406	560K	R618a, b	2W 0.3		
R229	470	R407	68K	R619a, b	2W 0.3		

CAPACITORS

SYMBOL NO.	DESCRIPTION	SYMBOL NO.	DESCRIPTION
C101	18PF ±5% 50V ceramic	C117	0.04μF + 80% – 20% 25V ceramic
C102	0.01μF + 80% – 20% 25V ceramic	C118	NONE
C103	0.04μF + 80% – 20% 25V ceramic	C119	JUMPER
C104	0.01μF + 80% – 20% 25V ceramic	C151	0.04μF + 80% – 20% 25V ceramic
C105	4700PF + 100% – 0% 50V ceramic		
C106	4700PF + 100% – 0% 50V ceramic	C201	0.01μF + 80% – 20% 25V ceramic
C107	0.01μF + 80% – 20% 25V ceramic	C202	0.04μF + 80% – 20% 25V ceramic
C108	20PF ± 5% 50V ceramic	C203	0.01μF + 80% – 20% 25V ceramic
C109	4700PF + 100% – 0% 50V ceramic	C204	0.01μF + 80% – 20% 25V ceramic
C110	33PF ± 5% 50V ceramic	C205	0.01μF + 80% – 20% 25V ceramic
C111	0.04μF + 80% – 20% 25V ceramic	C206	0.01μF + 80% – 20% 25V ceramic
C112	20PF ± 5% 50V ceramic	C207	33PF ± 5% 50V ceramic
C113	10PF ± 5% 50V ceramic	C208	10PF ± 5% 50V ceramic
C114	33PF ± 5% 50V ceramic	C209	0.01μF + 80% – 20% 25V ceramic
C115	10PF ± 5% 50V ceramic	C210	0.01μF + 80% – 20% 25V ceramic
C116	0.04μF + 80% – 20% 25V ceramic		

SYMBOL NO.	DESCRIPTION
C211	0.04μF +80% – 20% 25V ceramic
C212	10μF +50% – 10% 16V electrolytic
C213	0.04μF +80% – 20% 25V ceramic
C214	0.01μF +80% – 20% 25V ceramic
C215	33PF ±5% 50V ceramic
C216	0.04μF +80% – 20% 25V ceramic
C217	100μF +50% – 10% 16V electrolytic
C218	100PF ±10% 50V ceramic
C219	100PF ±10% 50V ceramic
C220	0.04μF +80% – 20% 25V ceramic
C221	0.04μF +80% – 20% 25V ceramic
C222	0.01μF +80% – 20% 25V ceramic
C223	0.04μF +80% – 20% 25V ceramic
C224	0.01μF +80% – 20% 25V ceramic
C225	0.04μF +80% – 20% 25V ceramic
C226	0.01μF +80% – 20% 25V ceramic
C227	0.01μF +80% – 20% 25V ceramic
C228	0.01μF +80% – 20% 25V ceramic
C229	0.01μF +80% – 20% 25V ceramic
C230	220PF ±10% 50V ceramic
C231	4.7μF +75% – 10% 25V electrolytic
C232	220PF ±10% 50V ceramic
C233	220PF ±10% 50V ceramic
C234	2.2μF +75% – 10% 25V electrolytic
C235	0.04μF +80% – 20% 25V ceramic
C251	0.04μF +80% – 20% 25V ceramic
C301	4.7μF +75% – 10% 25V electrolytic
C302	1500PF ±10% 50V ceramic
C303	10μF +50% – 10% 16V electrolytic
C304	4.7μF +75% – 10% 50V electrolytic
C305	330μF +50% – 10% 16V electrolytic
C306	4700PF ±10% 50V ceramic
C307	4700PF ±10% 50V ceramic
C308	0.47μF +75% – 10% 50V electrolytic
C309	0.47μF +75% – 10% 50V electrolytic
C310	1200PF ±10% 50V ceramic
C311	1200PF ±10% 50V ceramic
C312	3900PF ±10% 50V ceramic
C313	3900PF ±10% 50V ceramic
C314	1500PF ±10% 50V ceramic
C315	1500PF ±10% 50V ceramic
C316	0.47μF +75% – 10% 50V electrolytic
C317	0.47μF +75% – 10% 50V electrolytic
C318	47μF +50% – 10% 6V electrolytic
C319	470μF +50% – 10% 16V electrolytic
C320	0.47μF +75% – 10% 50V electrolytic
C321	0.47μF +75% – 10% 50V electrolytic
C322	0.47μF +75% – 10% 50V electrolytic
C351	1200PF ±10% 50V ceramic
C352	1200PF ±10% 50V ceramic
C401	10μF +50% – 10% 16V electrolytic
C402	0.04μF +80% – 20% 25V ceramic
C403	0.04μF +80% – 20% 25V ceramic
C404	10μF +50% – 10% 16V electrolytic
C405	10PF ±5% 50V ceramic
C406	360PF ±5% 50V ceramic
C407	20PF ±5% 50V ceramic
C408	4700PF ±10% 50V ceramic
C409	0.04μF +80% – 20% 25V ceramic
C410	0.04μF +80% – 20% 25V ceramic

SYMBOL NO.	DESCRIPTION
C411	0.01μF +80% – 20% 25V ceramic
C412	0.01μF +80% – 20% 25V ceramic
C413	100μF +50% – 10% 16V electrolytic
C414	NONE
C415	0.04μF +80% – 20% 25V ceramic
C416	0.47μF +75% – 10% 50V electrolytic
C417	0.04μF +80% – 20% 25V ceramic
C418	6800PF ±10% 50V ceramic
C419	4700PF ±10% 50V ceramic
C420	0.056μF ±10% 50V mylar
C421	100μF +50% – 10% 6V electrolytic
C501a, b	2.2μF ±20% 350 tantalum
C502a, b	100μF +50% – 10% 10V electrolytic
C503a, b	47PF ±10% 50V ceramic
C504a, b	150PF ±10% 50V ceramic
C505a, b	120PF ±10% 50V ceramic
C506a, b	10μF +50% – 10% 16V electrolytic
C507a, b	22μF +50% – 10% 6V electrolytic
C508a, b	0.47μF +40% – 20% 35V tantalum
C509a, b	1800PF ±10% 50V mylar
C510a, b	6800PF ±10% 50V mylar
C511	100μF +50% – 10% 50V electrolytic
C601a, b	2.2μF ±20% 35V tantalum
C602a, b	47μF +50% – 10% 35V electrolytic
C603a, b	120PF ±10% 50V ceramic
C604a, b	47μF +50% – 10% 35V electrolytic
C605a, b	220μF +50% – 10% 35V electrolytic
C606a, b	33PF ±10% 50V ceramic
C607a, b	180PF ±10% 50V ceramic
C608a, b	0.047μF ±10% 50V mylar
C609a, b	2200μF +50% – 10% 50V electrolytic
C610	33μF +50% – 10% 63V electrolytic
C611	100μF +50% – 10% 50V electrolytic
C612	0.005μF +80% – 20% 25V ceramic
C613	100μF +50% – 10% 50V electrolytic
C614	33μF +50% – 10% 63V electrolytic
C651a, b	220PF ±10% 50V ceramic
C701a, b	220PF ±10% 50V ceramic
C702a, b	0.01μF ±10% 50V mylar
C703a, b	0.1μF ±10% 50V mylar
C704a, b	2200PF ±10% 50V mylar
C801	0.01μF +100% – 0% 500V ceramic
C802	0.01μF +100% – 0% 500V ceramic
C803	220μF +50% – 10% 16V electrolytic
C851	0.047μF ±20% AC250V
C852	0.047μF ±20% AC250V
C853	4700μF ±50% – 10% 80V electrolytic
C901a, b	1μF ±20% 25V tantalum
C902a, b	18PF ±10% 50V ceramic
C903a, b	10μF ±20% 35V tantalum
C904a, b	100PF ±10% 50V ceramic
C905a, b	1200PF ±10% 50V mylar
C906a, b	0.033μF ±10% 50V mylar
C907a, b	0.033μF ±10% 50V mylar
C908a, b	3.3μF ±20% 25V tantalum
C909a, b	33PF ±10% 50V ceramic
C910a, b	2.2μF ±20% 35V tantalum
C911	220μF +50% – 10% 35V electrolytic

TRANSISTORS & IC

SYMBOL NO.	DESCRIPTION	
Q101	FM RF AMPLIFIER	3SK45
Q102	FM MIXER	3SK45
Q103	FM LOCAL OSCILATOR	2SC710
Q201	FM IF AMPLIFIER	2SC710
Q202	FM IF AMPLIFIER	2SC710
Q203	FM SIGNAL METER AMPLIFIER	2SC710
Q204	FM MUTING DC AMPLIFIER	2SC945, 2SC711
Q205	FM MUTING DC AMPLIFIER	2SC945, 2SC711
Q206	FM MUTING SWITCH	2SC945, 2SC711
Q207	FM MUTING SWITCH	2SC945, 2SC711
Q301	FM MUTING SWITCH	2SC945, 2SC711
Q302	FM MUTING	2SC945, 2SC711
Q303	FM MUTING	2SC945, 2SC711
Q304	FM AUDIO AMPLIFIER	2SC945, 2SC711
Q305	FM AUDIO AMPLIFIER	2SC945, 2SC711
Q501a, b	PHONO AMPLIFIER	2SC1000

SYMBOL NO.	DESCRIPTION	
Q502a, b	PHONO AMPLIFIER	2SA640
Q601a, b	POWER AMPLIFIER	2SA763
Q602a, b	POWER AMPLIFIER	2SC1539
Q603a, b	POWER AMPLIFIER	2SC1509
Q604a, b	POWER AMPLIFIER	2SC1509
Q605a, b	POWER AMPLIFIER	2SA777
Q606a, b	POWER AMPLIFIER	2SC1030
Q607a, b	POWER AMPLIFIER	2SC1030
Q608	POWER SUPPLY	2SC1509
Q609	POWER SUPPLY	2SC1509
Q610	POWER SUPPLY	2SC1509
Q901a, b	TONE AMPLIFIER	2SC1000
Q902a, b	TONE AMPLIFIER	2SA763
Q903a, b	TONE AMPLIFIER	2SC1000
IC201	FM/AM IF AMPLIFIER	AN277
IC301	FM STEREO DEMODULATOR	LA3301

DIODES

D201	AGC DETECTOR	IN60P
D202	AGC DETECTOR	IN60P
D203	AGC & METER DETECTOR	IN60P
D204	AGC & METER DETECTOR	IN60P
D205	METER DETECTOR	IN60P
D206	METER DETECTOR	IN60P
D207	METER DETECTOR	IN60P
D208	MUTING DC AMP. DETECTOR	IN60P
D209	VOLTAGE STABILIZER	KB269
D210	RATIO DETECTOR	IN60P
D211	RATIO DETECTOR	IN60P
D401	BIAS STABILIZER	KB169
D402	AUDIO & METER DETECTOR	IN60P
D601a, b	DETECTOR FOR PROTECTION	IS2473
D602a, b	DETECTOR FOR PROTECTION	IS188
D801	RECTIFIER	VO3
D802	RECTIFIER	VO3
D803	VOLTAGE STABILIZER	BZ-120
D804	VOLTAGE STABILIZER	BZ-140

VARIABLE RESISTORS

VR201 5K-B	SEMI FIXED FOR FM METER SETTING
VR202 1K-B	SEMI FIXED FOR FM MUTING LEVEL
VR301 1K-B	SEMI FIXED FOR FM SEPARATION
VR401 20K-B	SEMI FIXED FOR AM OUTPUT LEVEL
VR402 5K-B	SEMI FIXED FOR AM METER SETTING
VR601a,b 1K-B	SEMI FIXED FOR POWER AMP.
VR901 200K-BX2 with C.T.	FOR VOLUME CONT.
VR902 100K-B	FOR TONE CONT.
VR903 100K-B	FOR TONE CONT.
VR904 100K-B	FOR TONE CONT.
VR905 100K-B	FOR TONE CONT.

SWITCHES

S1	3-6-4	ROTARY SW FUNCTION
S2	1-2-4	ROTARY SW SPEAKER
S3	2-2	PUSH SW POWER
S701	2-2	LEVER SW MONITOR
S702	1-2	LEVER SW MODE
S703	2-2	LEVER SW LOW CUT
S704	2-2	LEVER SW HIGH CUT
S705	2-2	LEVER SW LOUDNESS
S706	1-2	LEVER SW MUTING
S707	4-2	LEVER SW TONE

TRANSFORMERS, COILS & FILTERS

SYMBOL NO.	DESCRIPTION	
T101	FM IF TRANS	109A
T201	FM DISCRIMINATOR TRANS	215D
T202	FM METER & MUTING TRANS	204E
T401	AM IF TRANS	406A
T402	AM IF TRANS	401D
L101	FM ANT COIL	107A
L102	FM RF COIL	121B

SYMBOL NO.	DESCRIPTION	
L103	FM OSCILATOR COIL	115L
L301	19KHz COIL	312A
L302	38KHz COIL	310B
L303	FM LOW-PASS FILTER COIL	146LYD-393J
L304	FM LOW-PASS FILTER COIL	146LYD-393J
L401	AM OSCILATOR COIL	413L
CF201	FM IF FILTER	SFE 10.7MA-8
CF202	FM IF FILTER	SFE 10.7MA-8

SPECIFICATIONS

AUDIO SECTION

CIRCUIT:	Quasi-complementary direct coupled condenser output amplifier
RMS POWER:	30/30 Watts (8 ohms, both channels driven)
T.H.D.:	<0.05% (8 ohms, 30 Watts at 1KHz) 0.1% (20-20KHz)
FREQUENCY RESPONSE:	10Hz-25KHz (−1dB) 5Hz−45KHz (−3dB)
POWER BANDWIDTH:	10Hz-40KHz (0.3%, −3dB)
INPUT SENSITIVITY: (at 30 Watts, 8 ohms, 1KHz)	PHONO 2.5mV AUX 150mV TAPE MONITOR 150mV
REC OUT:	150mV
DIN CONNECTOR:	TAPE MONITOR 150mV REC. OUT 30mV 90KΩ
EQUALIZER CURVE:	R.I.A.A.
PERMISSIBLE PHONO INPUT VOLTAGE:	100mV max at 1KHz
TONE CONTROL:	Treble ±8dB (10KHz) Bass ±8dB (100Hz)
FILTER:	HIGH CUT 7KHz 6dB/oct LOW CUT 70Hz 6dB/oct
LOUDNESS CONTROL:	Available
S/N RATIO:	PHONO >65dB AUX >80dB TAPE MONITOR >80dB
RESIDUAL NOISE:	<1.0mV
ACCESSORIES:	Head-phone Jack, Mode Selector (stereo-mono), Speaker Selector (A, B, A+B, OFF), Tape Monitor Circuit, Tone Control ON-OFF Switch, De-emphasis Switch (50/75μsec) for R600E. AC Outlet for R600E, Voltage Selector (100, 120, 220, 240V) for R600E

AM SECTION

IHF SENSITIVITY:	250μV/m
S/N RATIO:	50dB
IF REJECTION:	40dB
IMAGE REJECTION:	50dB
T.H.D.:	0.7%

FM SECTION

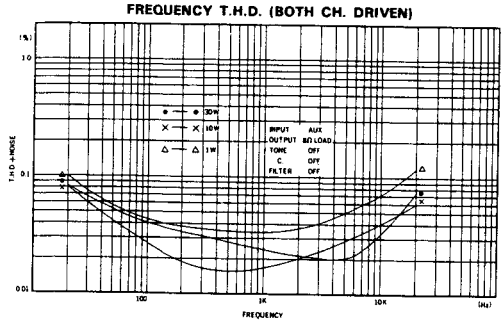
IHF SENSITIVITY:	2.1μV
SENSITIVITY FOR 50dB S/N:	3.8μV
ULTIMATE S/N:	70dB
T.H.D. Mono:	0.3%
Stereo:	0.6%
ALTERNATE CHANNEL SELECTIVITY:	55dB
IF REJECTION:	90dB
IMAGE REJECTION:	60dB
SPURIOUS RESPONSE REJECTION:	70dB
AM SUPPRESSION:	50dB
CAPTURE RATIO:	1.7dB
STEREO SEPARATION:	38dB (at 400Hz) 30dB (100Hz-10KHz)
MUTING THRESHOLD:	7μV
STEREO THRESHOLD:	7μV
FREQUENCY RESPONSE (Mono Stereo):	30Hz to 15KHz +0.3dB −2.5dB

GENERAL SPECIFICATION

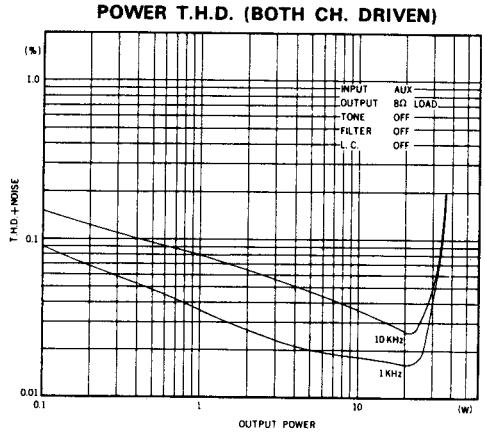
POWER REQUIREMENT:	R600S 220V 50-60Hz AC R600E 100/120/220/240V 50-60Hz AC
POWER CONSUMPTION:	140W (at rated output)
DIMENSIONS:	(W) 480mm (18-1/8") x (D) 360mm (14-3/16") x (H) 345mm (13-5/8")
WEIGHT:	13Kgs

AUDIO SECTION

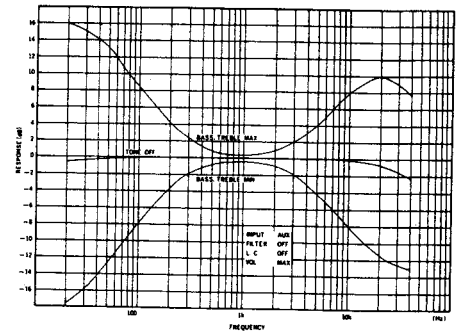
FREQUENCY T.H.D. (BOTH CH. DRIVEN)



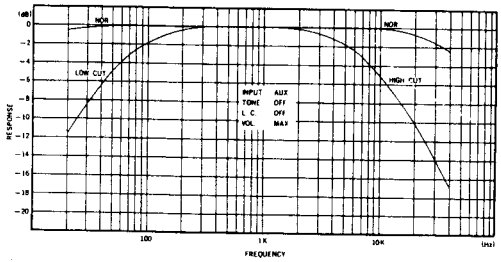
POWER T.H.D. (BOTH CH. DRIVEN)



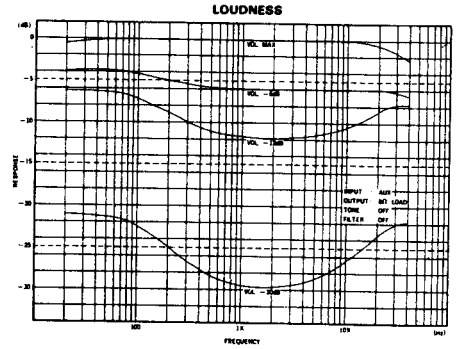
TONE CONTROL



FILTER

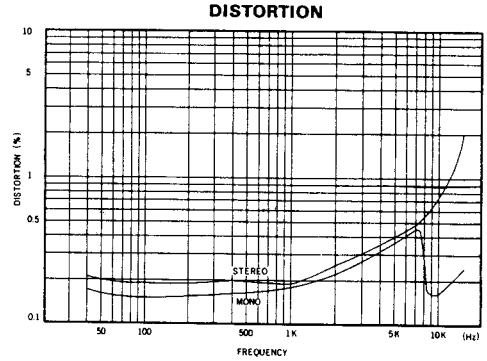


LOUDNESS

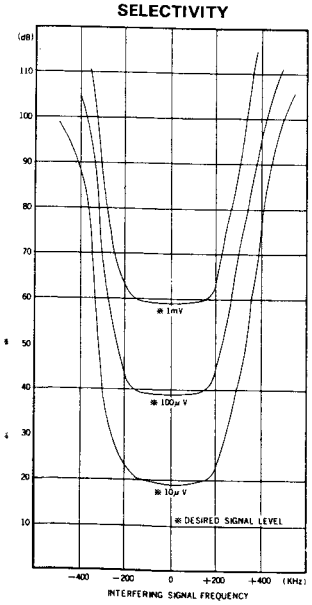


RF SECTION

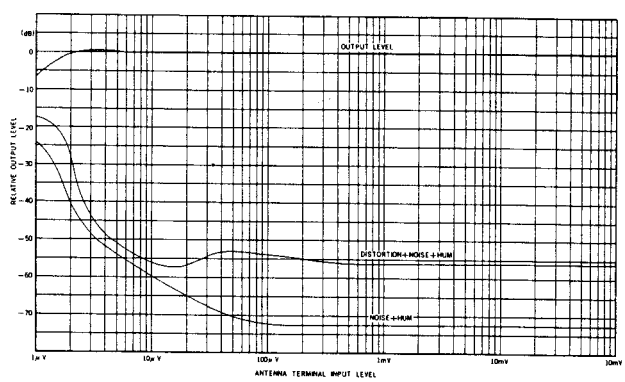
DISTORTION



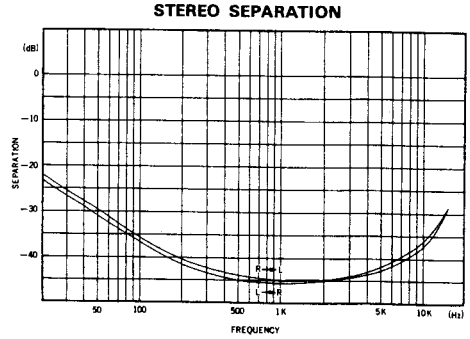
SELECTIVITY



FM CHARACTERISTIC

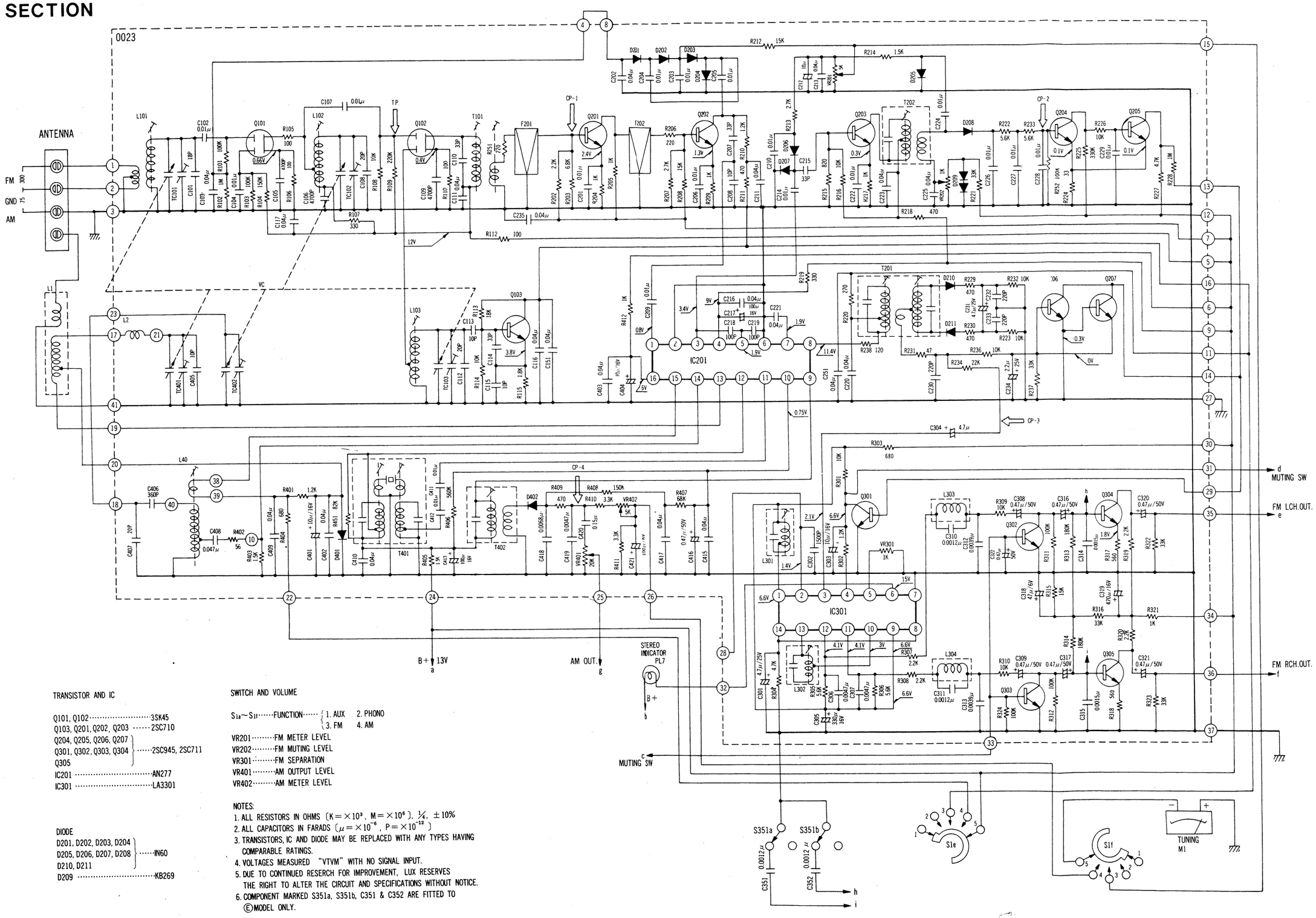


STEREO SEPARATION



Specifications and appearance design subject to possible change without notice.

■ RF SECTION



TRANSISTOR AND IC

Q101, Q102 ..... 3SK45
Q103, Q201, Q202, Q203 ..... 2SC710
Q204, Q205, Q206, Q207, Q301, Q302, Q303, Q304, Q305 ..... 2SC945, 2SC711
IC201 ..... AN277
IC301 ..... LA3301

DIODE

D201, D202, D203, D204, D205, D206, D207, D208, D210, D211 ..... IN60
D209 ..... KB269

SWITCH AND VOLUME

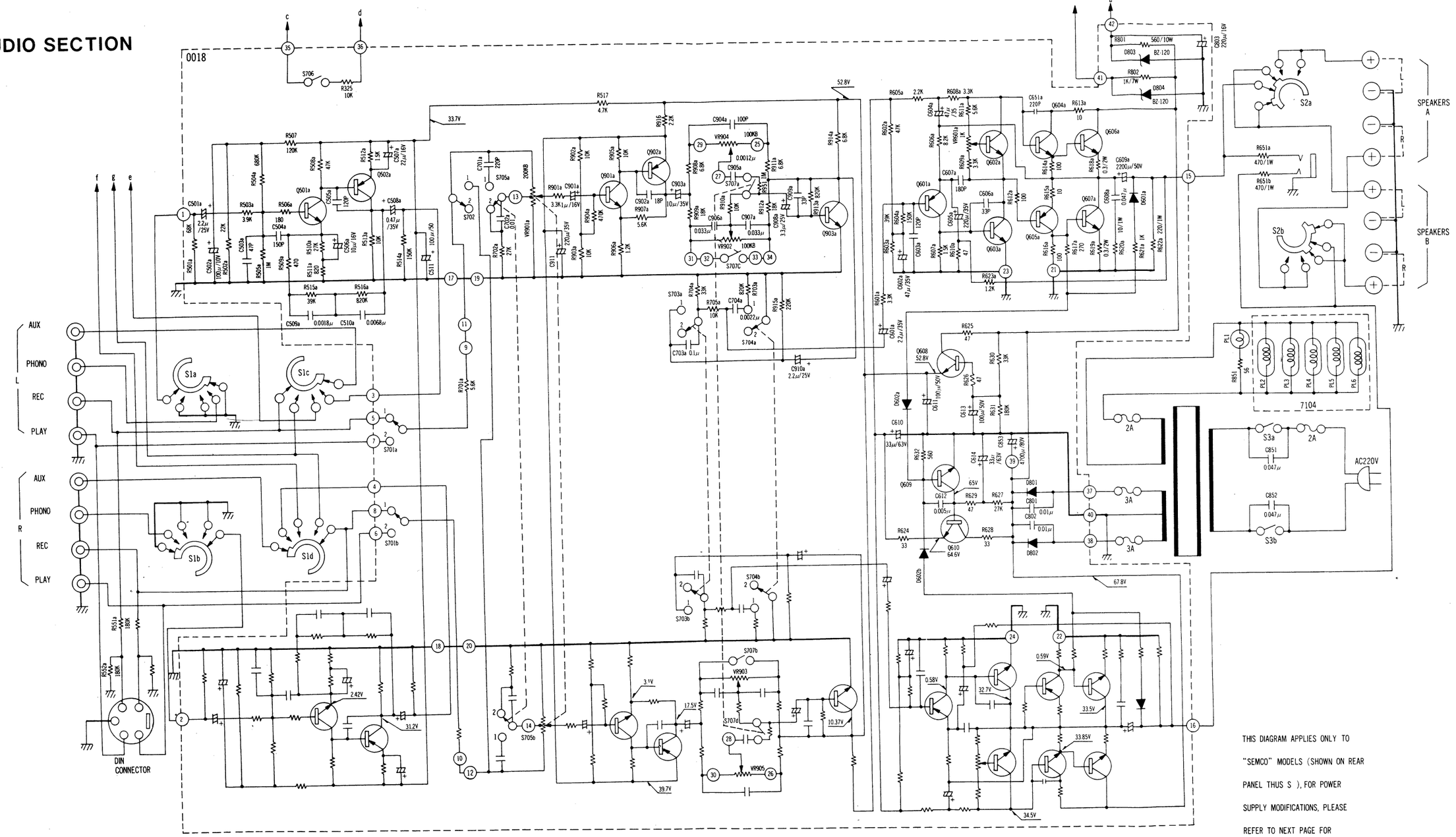
S1a~S1f ..... FUNCTION ..... 1. AUX 2. PHONO 3. FM 4. AM

VR201 ..... FM METER LEVEL
VR202 ..... FM MUTING LEVEL
VR301 ..... FM SEPARATION
VR401 ..... AM OUTPUT LEVEL
VR402 ..... AM METER LEVEL

NOTES:

1. ALL RESISTORS IN OHMS (K=×10³, M=×10⁶), ¼, ±10%
2. ALL CAPACITORS IN FARADS (μ=×10⁻⁶, P=×10⁻¹²)
3. TRANSISTORS, IC AND DIODE MAY BE REPLACED WITH ANY TYPES HAVING COMPARABLE RATINGS.
4. VOLTAGES MEASURED "VTVM" WITH NO SIGNAL INPUT.
5. DUE TO CONTINUED RESERCH FOR IMPROVEMENT, LUX RESERVES THE RIGHT TO ALTER THE CIRCUIT AND SPECIFICATIONS WITHOUT NOTICE.
6. COMPONENT MARKED S351a, S351b, C351 & C352 ARE FITTED TO Ⓔ MODEL ONLY.

■ AUDIO SECTION



TRANSISTOR AND DIODE

Q502a,b	2SA640	D801, D802	V03
Q901a,b Q903a,b	2SC1000	D602a,b	IS188
Q902a,b Q601a,b	2SA763	D601a,b	IS2473
Q602a,b	2SC1539	D803, D804	BZ-120
Q605a,b	2SA777		
Q606a,b Q607a,b	2SC1030		
Q603a,b Q604a,b Q608,Q609,Q610	2SC1509		

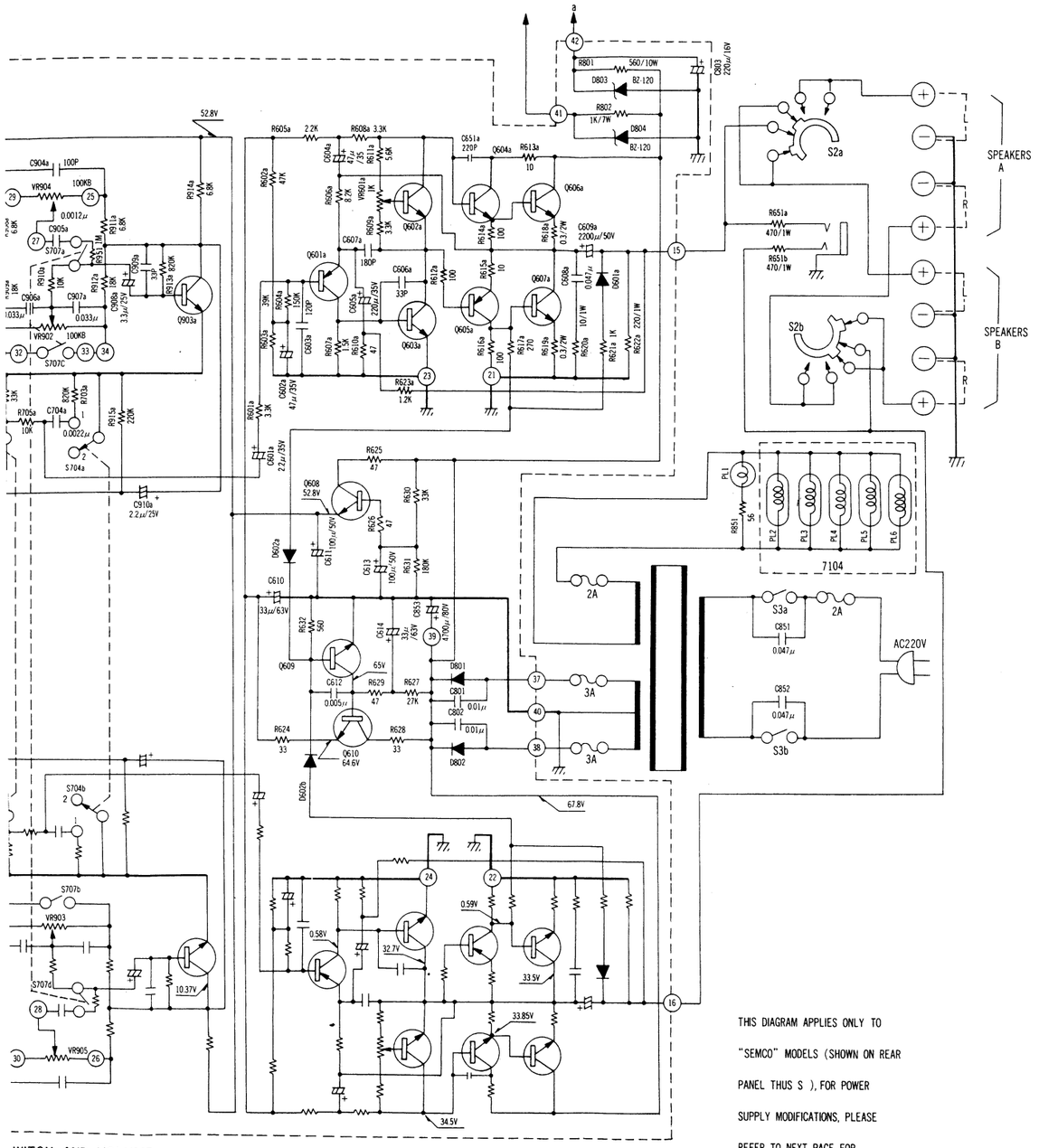
SWITCH AND VOLUME

S1a～S1d FUNCTION
①AUX ②PHONO ③FM ④AM
S2a, S2b SPEAKER SELECTER
B, A, A+B, OFF,
S3a,b POWER SW
S701a,b TAPE ①OFF ②ON
S702 MODE ①MONO ②STEREO
S703a,b LOW CUT FILTER ①OFF ②ON
S704a,b HIGH CUT FILTER ①ON ②OFF

S705a,b LOUDNESS ①ON ②OFF
S706 MUTING SW
S707a,b,c,d, TONE

VR 901a,b VOLUME CONTROL
VR 902,903 BASS CONTROL
VR 904,905 TREBLE CONTROL
VR 601a,b BIAS ADJUST CONTROL

THIS DIAGRAM APPLIES ONLY TO "SEMCO" MODELS (SHOWN ON REAR PANEL THUS S), FOR POWER SUPPLY MODIFICATIONS, PLEASE REFER TO NEXT PAGE FOR DETAIL OF ANOTHER MODELS.



WITCH AND VOLUME

1a～S1d FUNCTION
①AUX ②PHONO ③FM ④AM
2a, S2b SPEAKER SELECTER
B, A, A+B, OFF,
3a,b POWER SW
701a,b TAPE ①OFF ②ON
702 MODE ①MONO ②STEREO
703a,b LOW CUT FILTER ①OFF ②ON
704a,b HIGH CUT FILTER ①ON ②OFF

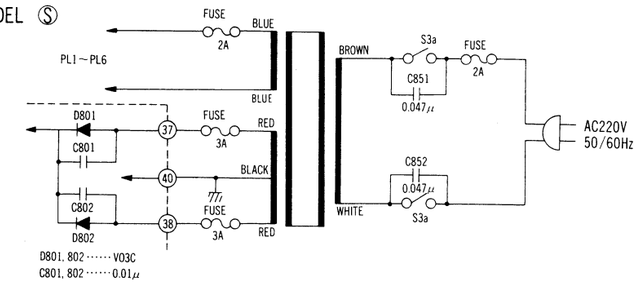
S705a,b LOUDNESS ①ON ②OFF
S706 MUTING SW
S707a,b,c,d, TONE

VR 901a,b VOLUME CONTROL
VR 902,903 BASS CONTROL
VR 904,905 TREBLE CONTROL
VR 601a,b BIAS ADJUST CONTROL

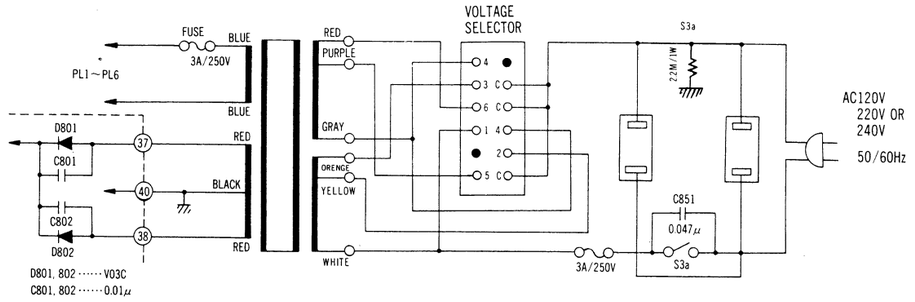
THIS DIAGRAM APPLIES ONLY TO "SEMCO" MODELES (SHOWN ON REAR PANEL THUS S), FOR POWER SUPPLY MODIFICATIONS, PLEASE REFER TO NEXT PAGE FOR DETAIL OF ANOTHER MODELS.

POWER SUPPLY DIAGRAM FOR THE TWO MODELES

SEMCO MODEL Ⓢ



EUROPEAN & CANADIAN MODEL Ⓔ



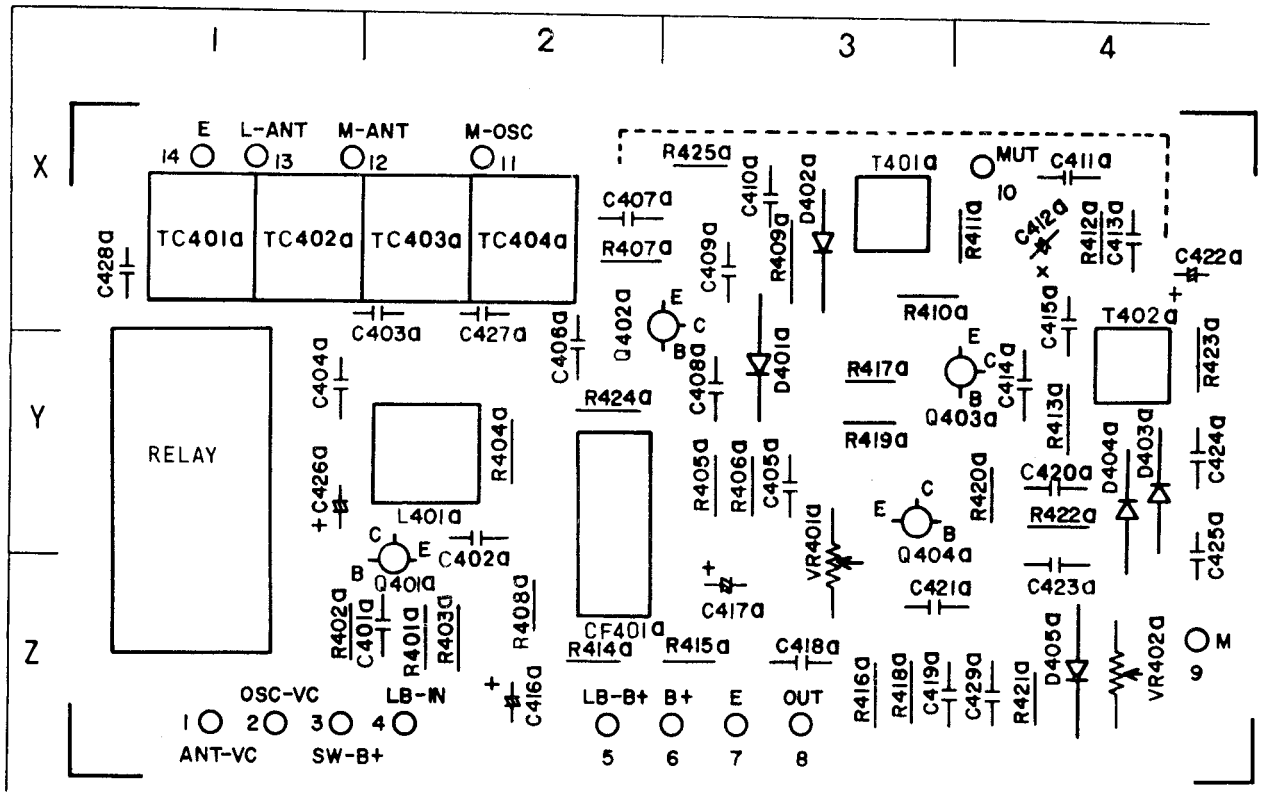
R620 MW & LW IF BOARD ALIGNMENT PROCEDURES

Note: Alignment Procedures of R620 receiver is the same as R600 receiver except for MW & LW IF section

Note: Figures in parentheses are for LW alignment

Step	Signal Source Connected to	Set signal to	Set Radio Dial to	Output Indicator Connected to	Adjust	Adjust for
1	Set selector switch to MW (LW).					
2	Sweep Generator PCB#0023 19 (PCB#4015) through 1uF mylar capacitor	±20 - 25KHz sweep centred at 455KHz generator output level 3mV	Quiet point on band near 600KHz (160KHz)	Oscilloscope P.C.B.#0023 CP-4 (P.C.B.#4015 CP-5)	T401 red core (CF401a red core)	Maximum symmetrical response with flat top Do not adjust for two humps
3					T401 blue core (CF401a blue core)	
4					T402 black core (T401a, T402a)	
5	Adjust VR401 (VR401a) and VR402 (VR402a) to mechanical center position.					
6	AM signal generator Standard radiating loop antenna placed near MW & LW built in antenna	600KHz (160KHz) at 400Hz 30% modulation, field strength 50dB/m	600KHz (160KHz)	Oscilloscope AC VTVM REC OUT	L401 core (L401a core)	Accurate indication of pointer on dial to within ±1 pointer width
7					L1 coil (L2 coil)	Maximum reading on AC VTVM
8		1400KHz (340KHz) at 400Hz 30% modulation, field strength 50dB/m	1400KHz (340KHz)		TC404a (TC403a)	Accurate indication of pointer on dial to within ±1 pointer width
9					TC402a (TC401a)	Maximum reading on AC VTVM
10	Repeat steps 6 - 9 as necessary to obtain exact tuning on dial scale and maximum sensitivity.					
11	AM Signal generator standard radiating loop antenna placed near MW & LW bar antenna	1000KHz (240KHz) at 400Hz 30% modulation, field strength 45dB/m	1000KHz (240KHz)	Oscilloscope AC VTVM REC OUT	VR401 (VR401a)	Audio output level should be 95mV
12		1000KHz (240KHz) at 400Hz 30% modulation, field strength 74dB/m			VR402 (VR402a)	Adjust to read 60 - 80% of full scale of meter

4015



PB4015 Component Location

R401a	Z2	C408a	Y3	D403a	Y4
R402a	Z1	C409a	X3	D404a	Y4, Z4
R403a	Z2	C410a	X3	D405a	Z4
R404a	Y2	C411a	X4		
R405a	Y3	C412a	X4	CF401a	Y1, Z2
R406a	Y3	C413a	X4		
R507a	X2	C414a	Y4	T401a	X3
R408a	Z2	C415a	X4, Y4	T402a	X4, Y4
R409a	X3	C416a	Z2		
R410a	X3	C417a	Z3	L401a	Y2
R411a	X4	C418a	Z3		
R412a	X4	C419a	Z3	TC401a	X1
R413a	Y4	C420a	Y4	TC402a	X1
R414a	Z2	C421a	Z3, Z4	TC403a	X2
R415a	Z3	C422a	X4	TC404a	X2
R416a	Z3	C423a	Z4		
R417a	Y3	C424a	Y4	RELAY	Y1, Z1
R418a	Z3	C425a	Y4, Z4		
R419a	Y3	C426a	Y1		
R420a	Y4	C427a	X2	(1)	Z1
R421a	Z4	C428a	X1	(2)	Z1
R422a	Y4	C429a	Z4	(3)	Z1
R423a	X4, Y4			(4)	Z2
R424a	Y2	VR401a	Y3, Z3	(5)	Z2
R425a	X3	VR402a	Z4	(6)	Z3
				(7)	Z3
C401a	Z2	Q(Tr)401a	Y2, Z2	(8)	Z3
C402a	Y2	Q(Tr)402a	X2, X3	(9)	Z4
C403a	X2	Q(Tr)403a	Z4	(10)	X4
C404a	Y1	Q(Tr)404a	Y3	(11)	X2
C405a	Y3			(12)	X1
C406a	X1, Y2	D401a	X3, Y3	(13)	X1
C407a	X2	D402a	X3	(14)	X1

REPLACEMENT PARTS OF PB4015 LW IF BOARD

RESISTORS; ±10% ¼ Watt deposited carbon, unless noted otherwise

R401a	47K	R410a	15K	R419a	1M
R402a	220K	R411a	4.7K	R420a	18K
R403a	33K	R412a	1K	R421a	18K
R404a	91	R413a	100	R422a	1K
R405a	1K	R414a	1K	R423a	15K
R406a	10K	R415a	100	R424a	68K
R407a	1K	R416a	12K	R425a	68K
R408a	270K	R417a	220		
R409a	3.3K	R418a	56K		

CAPACITORS

C401a	0.02uF	25V	±10% Ceramic
C402a	0.04uF	25V	±10% Ceramic
C403a	75pF	50V	±10% Ceramic
C404a	160pF	50V	±10% Ceramic
C405a	0.04uF	25V	±10% Ceramic
C406a	0.02uF	25V	±10% Ceramic
C407a	0.04uF	25V	±10% Ceramic
C408a	0.04uF	25V	±10% Ceramic
C409a	1pF	50V	±10% Ceramic
C410a	0.02uF	25V	±10% Ceramic
C411a	0.02uF	25V	±10% Ceramic
C412a	47uF	6.3V	+50% −10% Electrolytic
C413a	0.04uF	25V	±10% Ceramic
C414a	1pF	50V	±10% Ceramic
C415a	0.02uF	25V	±10% Ceramic
C416a	47uF	16V	+50% −10% Electrolytic
C417a	100uF	16V	+50% −10% Electrolytic
C418a	0.018uF	50V	±10% Polyester
C419a	0.033uF	50V	±10% Polyester
C420a	0.0015uF	50V	±10% Ceramic
C421a	0.012u	50V	±10% Polyester
C422a	10uF	16V	+50% −10% Electrolytic
C423a	0.01uF	25V	±10% Ceramic
C424a	0.02uF	25V	±10% Ceramic
C425a	0.02uF	25V	±10% Ceramic
C426a	4.7uF	25V	+75% −10% Electrolytic
C427a	10pF	50V	±10% Ceramic
C428a	Not Used		
C429a	0.04uF	25V	±10% Ceramic

TRANSISTOR & DIODES

Q(Tr)401a	OSC & MIXER 2SC930	D401a	LIMITER IN60P
Q(Tr)402a	LW IF AMPLIFIER 2SC930	D402a	LIMITER IN60P
Q(Tr)403a	LW IF AMPLIFIER 2SC930	D403a	DETECTOR IN60P
Q(Tr)404a	AUDIO AMPLIFIER 2SC1681	D404a	METER DETECTOR IN60P
		D405a	METER LIMITER IN60P

VARIABLE RESISTORS

VR401a	20K/B OUTPUT LEVEL	VR402a	20K/B METER SETTING

VARIABLE CAPACITORS

TC401a	LW ANT TRIMMER 15pF	TC403a	LW OSC TRIMMER 15pF
TC402a	MW ANT TRIMMER 15pF	TC404a	MW OSC TRIMMER 15pF

COIL, CERAMIC FILTER & TRANSFORMERS

L401a	LOCAL OSC COIL 414L	T401a	LW IFT 405B
CF401a	LW IF FILTER 406A	T402a	LW IFT 406D

SWITCH

RELAY	MW-LW VC SWITCHING AE-1324

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1-8-31 NAGAHASHI, NISHINARI-KU, OSAKA
PHONES: 632 0031 CABLE: LUXELECT OSAKA TELEX: J63694

Printed in Japan